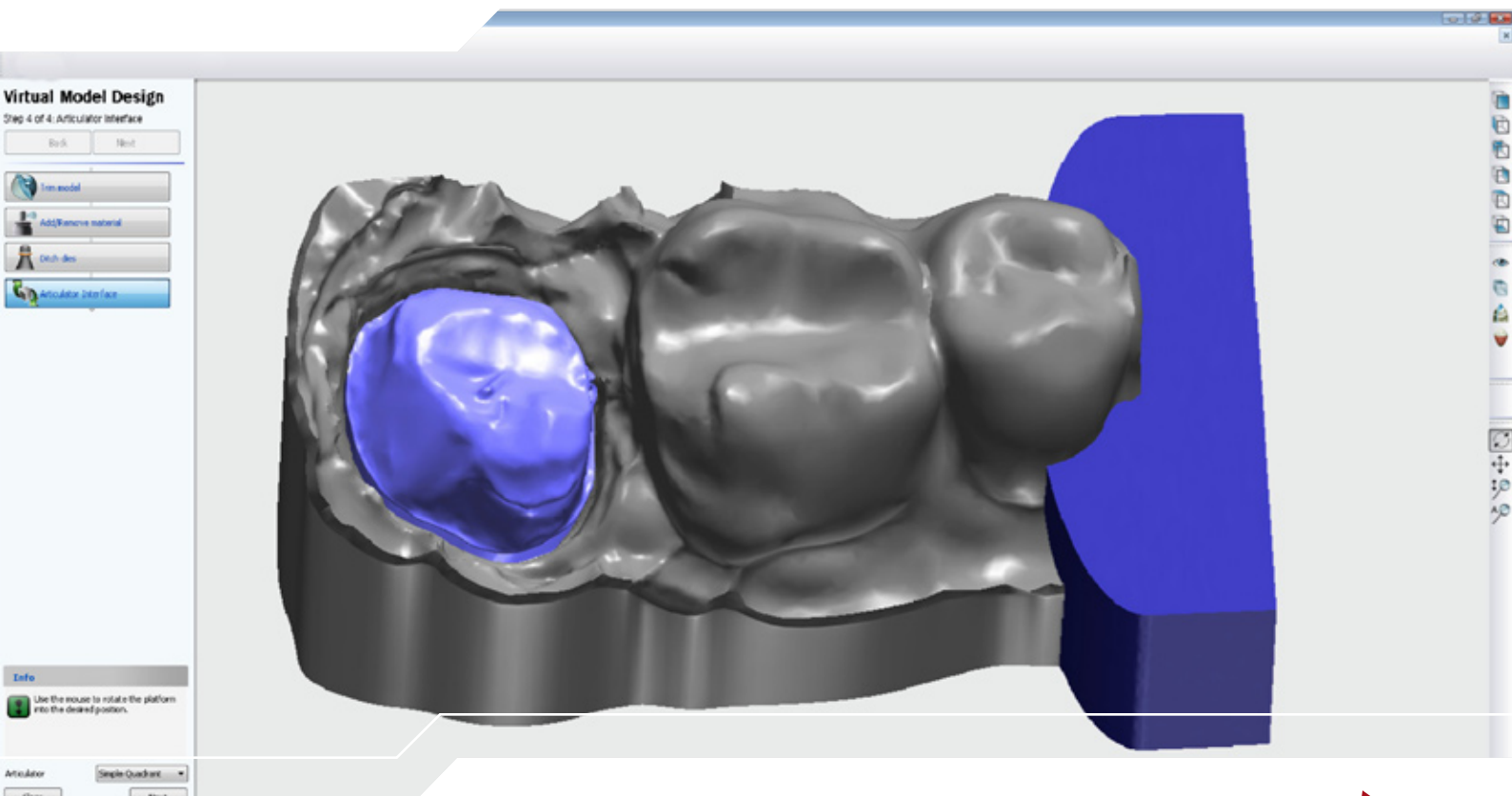


WIELAND



Dental System by **3shape** 

User Manual – Version 2009

3Shape Dental System 2009

User Manual



Introduction

The 3Shape Dental System is a unique combination of 3Shape's expertise in 3D scanning and 3D CAD software for creating accurate, customized dental restorations with high esthetics.

This new version introduces several significant additions and improvements. For example; a broadened range of dental indications offering a palette which is second to none, unique process optimization through adaptive impression scanning, enhanced design efficiency and flexibility, and intuitive free-form modeling tools - All enabling superior restorative work of the highest quality, fit and esthetics.

This manual describes 3Shape Dental System consisting of the following applications:

- 1. Order creation & management - DentalManager™**
- 2. Scanning models - ScanItRestoration™**
- 3. Scanning impressions - ScanItImpression™**
- 4. Modeling - DentalDesigner™**
- 5. System configuration - Dental System Control Panel™**
- 6. Custom libraries - ScanItLibrary™**
- 7. Installation - Dental System Installer™**

3Shape Dental System supports multiple languages throughout the applications: English, German, French, Italian, Spanish, Japanese, Korean and Russian.

The Software described in the manual is covered by the Terms and Conditions according to the End User License Agreement issued either by 3Shape A/S or by 3Shape A/S Partner from whom you have acquired the Partner version software.

Should you have questions regarding the content of a particular software version or system configuration, please contact your local 3Shape solution provide

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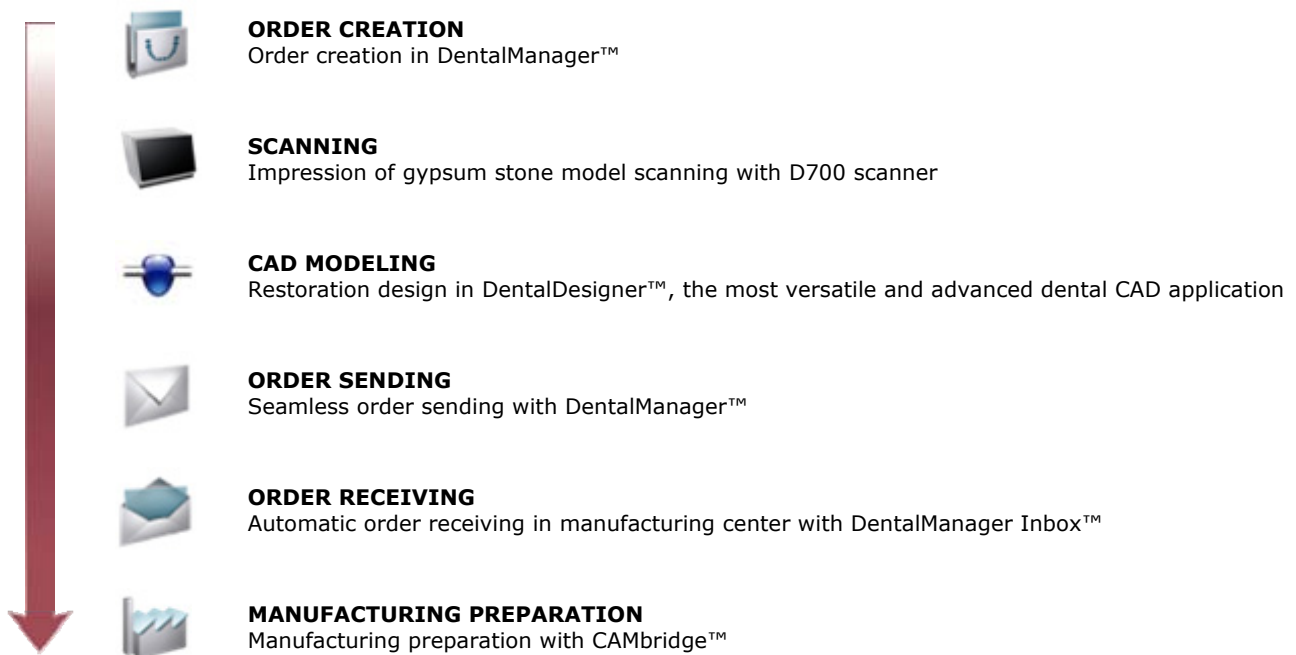
Workflow

With the 2009 version, the 3Shape Dental System further builds upon its position as the leading CAD/CAM solution on the market. The system gives laboratories of any size the opportunity to offer the highest level of output quality, improve their productivity and turnaround time, and future-proof their business.

Through an intuitive and user-friendly interface users can scan and design an extensive list of supported restorative indications, applicable for manufacturing in any suitable material (or as determined by your 3Shape solution provider and/or manufacturing facility).

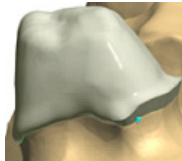
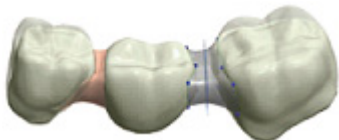
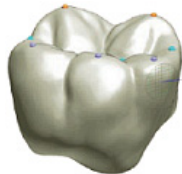





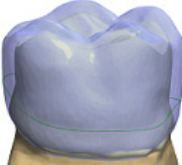
Depending on the system configuration and software modules purchased, and the model of 3Shape scanner utilized, some functionality of the 3Shape Dental System may not be included or supported in your particular set-up. Hence, some of the features described and images shown within the manual may not apply to your solution, and may require additional license fees if applicable.

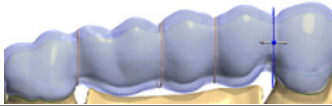
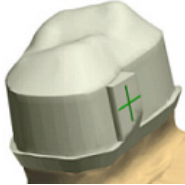


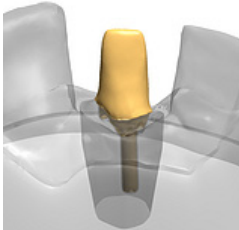
As an example of this, restorative design based upon impression scanning requires the presence of the 3Shape D700 scanner and the add-on ScanItImpression software module. Also the design of customized abutments, bars and implant bridges require the AbutmentDesigner™ add-on software module.



Indications

The table shows a wide range of indications supported by 3Shape Dental System 2009. Click on one of the links of the required indication to go directly to the chapters describing its order creation, scanning or design processes.

Single coping		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Bridge framework		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Full anatomical crown		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Full anatomical bridge		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Anatomical copings and framework		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Inlay / Inlay bridge		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Onlay / Veneers		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Over-pressed crowns and bridges		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Single wax up		<ul style="list-style-type: none"> • Order creation • Scanning • Design

Wax up bridge		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Telescope		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Customized abutments		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Implant bars and bridges		<ul style="list-style-type: none"> • Order creation • Scanning • Design
Post & core		<ul style="list-style-type: none"> • Order creation • Scanning • Design

1. Scanner and ScanServer

3Shape ScanServer application works as a driver to pair a 3D scanner with the scanning software.

While having the advanced features, the Scanner and ScanServer application are still easy to operate and require a minimum amount of training. The simplicity of the process is achieved with an easy and quick fixation of the scanned object, followed by a click on a button in the scanning software to initiate the scanning process. The scanning process is described in details in the Scanning Models - ScanItRestoration chapter.

The introduction of the new advanced 3Shape D700 scanner builds up on 3Shape's scanning expertise and is optimized for scanning of impressions and full dental gypsum models up to 40% faster and with greater details than 3Shape's previous D640 scanner. The D700 scanner guarantees superior scan results without compromising the ease of use.

Apart from the newly added features the description of the scanning process in the manual also applies to the previous scanner models: D640 and D250.

1.1 Unpacking and Installation of D700

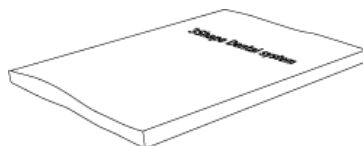
The D700 scanner is packed together with all the accessories needed to connect it to the scan-server PC and operate. Special packaging materials made from transport security foam are used to protect the scanner and accessories during transportation. When unpacking, please verify the package contents and contact your 3shape re-seller's customer support if any part is found missing or defective.

Content of the box:

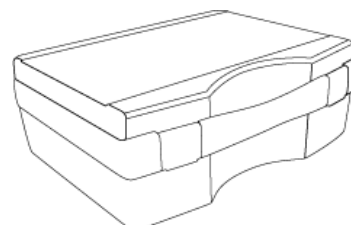
D700 Scanner



User Manual



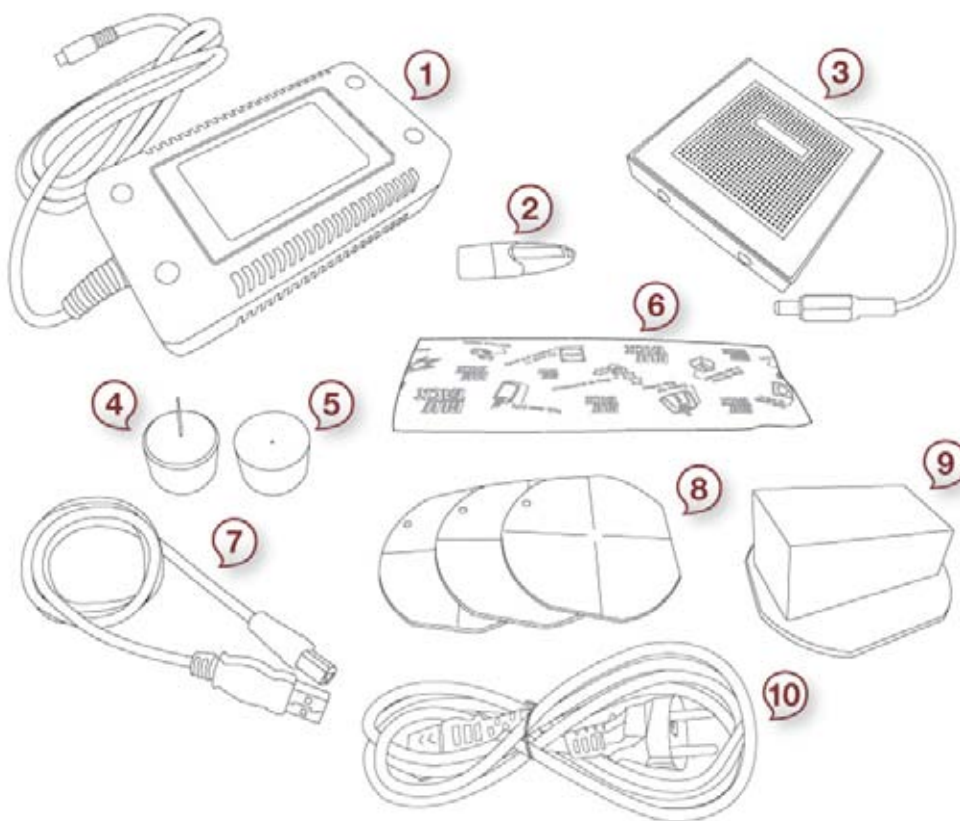
Calibration box



Content of calibration box:

The calibration box contains:

1. Power supply
2. USB dongle key (red or blue)
3. Calibration "dot plate"
4. Pontic scan pin
5. Pontic scan pin protection foam
6. Scanning clay
7. USB cable
8. 3 x Scanning plates
9. Calibration "Square"
10. Power cord



The D700 scanner is tested, sold and delivered together with an approved PC. 3Shape does not guarantee the functioning of the D700 if: third party software is installed on the ScanServer PC, if third party computer peripherals are installed (e.g. USB flash key, WLAN adapters) or if the software is installed on a different PC

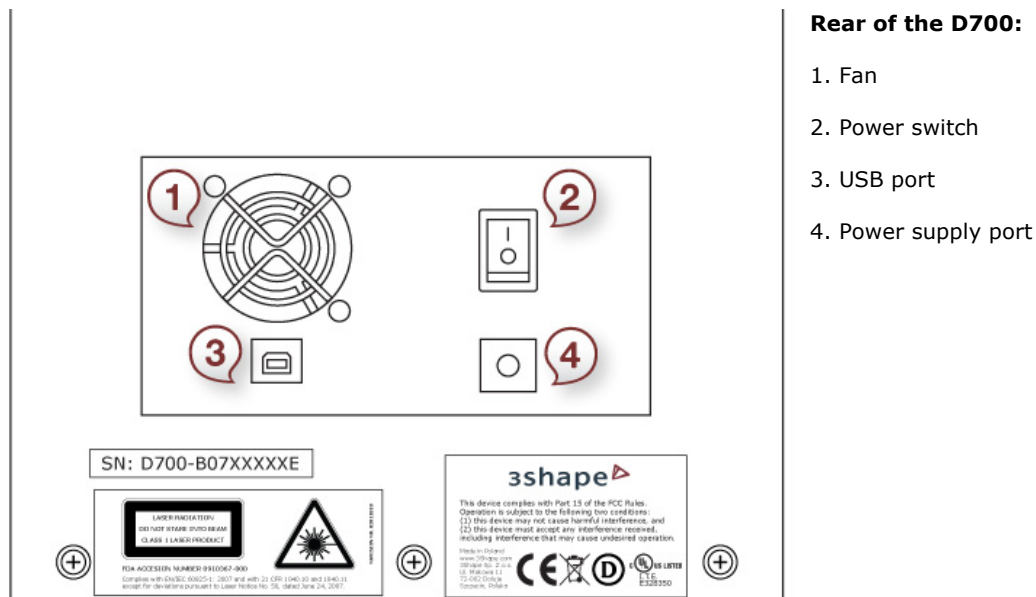


Note! The default Windows user name and password for the 3Shape PC is "**scan**".

1.2 ScanServer

The 3Shape ScanServer application program works as a software driver to bridge the gap between the scanner hardware and the scanning applications e.g., ScanItRestoration. Therefore, its function is to provide a low-level hardware communication with the scanner and to output the 3D pointcloud based on the scanner cameras input. Whenever a scan is to be performed, the ScanServer needs to be "ON" and ready for operation.

Connect your scanner to the PC using the USB cable. USB (Universal Serial Bus) cables are standard data transmission cables. The flat end of the cable is plugged into the computer, the square end into the scanner. The USB cable should be plugged into one of the rear ports of the computer.



Connect the power supply to the scanner power supply port and plug the power supply to the power outlet. Use standard precaution when operating the scanner power supply.



Caution! We strongly recommend that both the scanner power supply and scan-server PC power cable are plugged into a UPS unit (rather than directly into the mains outlet) to prevent work losses and damages to the equipment.



With the launch of ScanServer (either through the desktop icon or from DentalManager), an icon with a flashing green light appears in the system tray. When this green light becomes steady, the ScanServer is ready for operation.

Launch the ScanServer application only after having plugged the scanner to the scan-server PC and switching the scanner "ON"; otherwise, the following error message will pop up: *"No scanner is connected to the PC by USB. Please check the power and USB cable and try again"*.

1.3 Scanner Calibration

By calibrating the scanner the internal scanner geometry and camera parameters are calculated. It is recommended to calibrate the scanner each time it is moved or at least twice a week. However, if the scanner is placed on a stable table and at a constant temperature, the calibration intervals can be increased. A calibration is always required when a scanner is first unpacked.

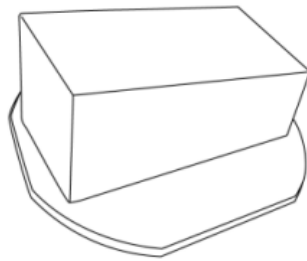
An indication of a poorly calibrated scanner is a scanned model with a rough surface. When this happens, check if it is a recurrent problem, as it might be attributed to the object not properly placed on the fixture, or the fixture is not firmly fixed to the black interface plate. Try scanning different objects, and in particular objects of different materials. If the problem persists, please contact your 3Shape re-seller's customer support. No other maintenance besides calibration is required for the scanner.



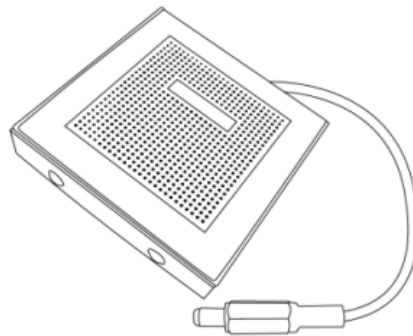
Caution! Beware that the scanner is a precision mechanical device sensitive to temperature and power variations as well as vibrations.

The calibration is performed using the "dot plate" calibration object and the "square calibration object" supplied with your scanner (see images below). The procedure is simple and nearly completely automatic:

1. Click on the **ScanServer** icon in the system tray, and the ScanServer window will pop-up. Press **Calibrate scanner** button on the ScanServer window in the lower right part of the screen. You will be prompted for a password, which is "**docal**". The reason for the password is to keep unauthorized personnel from trying to calibrate the scanner.
2. A new window opens. Follow the detailed instructions in this window, which will guide you through the full calibration process.



Calibration "square"



Calibration "dot plate"

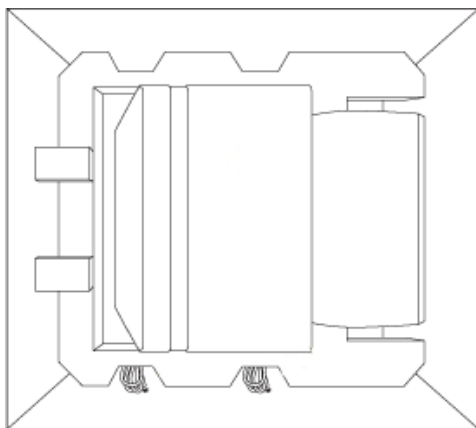
1.4 Scanner Transportation

If the scanner needs to be transported to a different site, it is important that original packaging materials and boxes are used to avoid damage to the scanner during transportation.

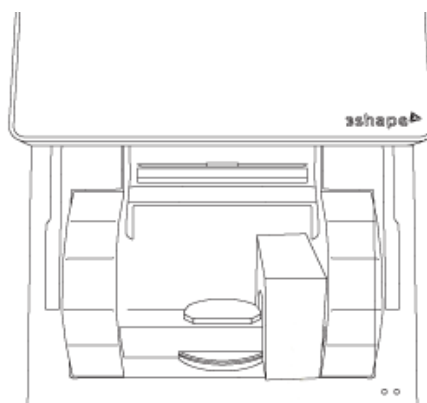
1.4.1 Transportation of D700 and D640

Please follow the steps below to perform a successful transportation:

1. Switch off the PC and disconnect the scanner.
2. Fasten the swing axis using the protection foam.
3. Place the scanner into the original box using the original foam.



The scanner is packed correctly



The swing axis foam is packed correctly

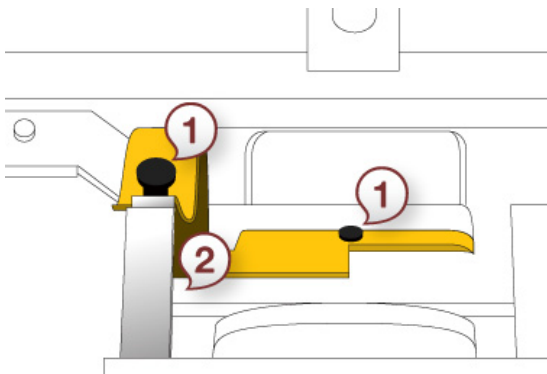


Caution! The swing axis of the scanner should be secured each time the scanner is transported using the swing protection foam. If the original packing materials have been lost or damaged, a new packaging set can be ordered from 3Shape.

1.4.2 Transportation of D250

Please follow the steps below to perform a successful transportation:

1. Press the **Transport Position** button in the ScanServer program to place the linear axis in the correct position.
2. Close down the ScanServer software and mount the transportation security plate.



1. Two bolts for transport security plate
2. Transport security plate

2. Order Creation & Management - DentalManager

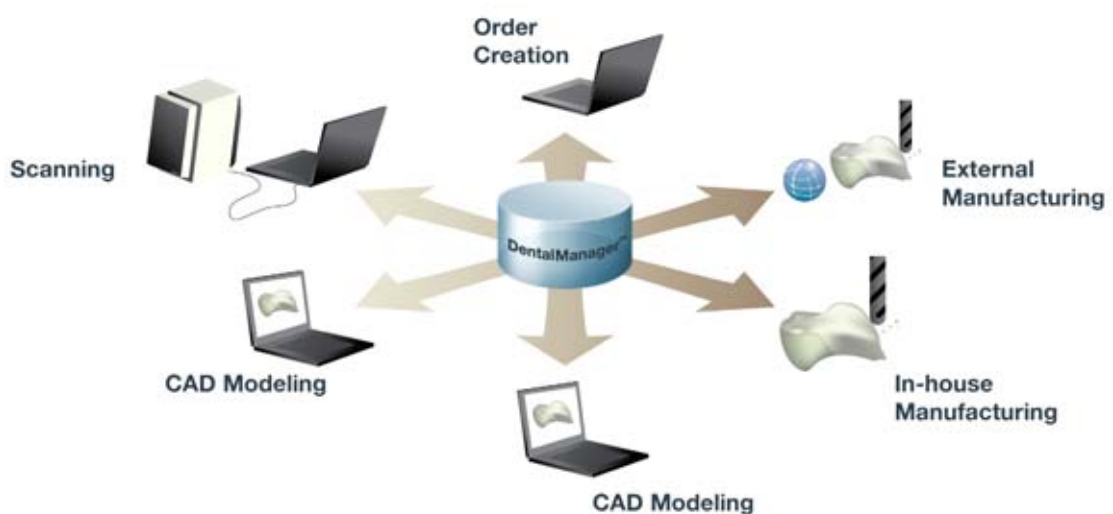
3Shape DentalManager is a part of 3Shape Dental System comprised of a number of separate applications. DentalManager is the main application handling the orders through the production processes, and controlling the ScanItRestoration and DentalDesigner applications.

3Shape DentalManager is an easy-to-use data management application, which systematically organizes all production data and acts as a platform for active order data management through the production stages:

- Order Creation,
- Scanning,
- Designing,
- Sending for Manufacturing and
- Manufacturing.

DentalManager ensures that new order creation, case scanning and restoration design can take place in parallel to one another (see the image below).

3Shape DentalManager comes with a standard Order handling part, which can be extended with an Inbox module.

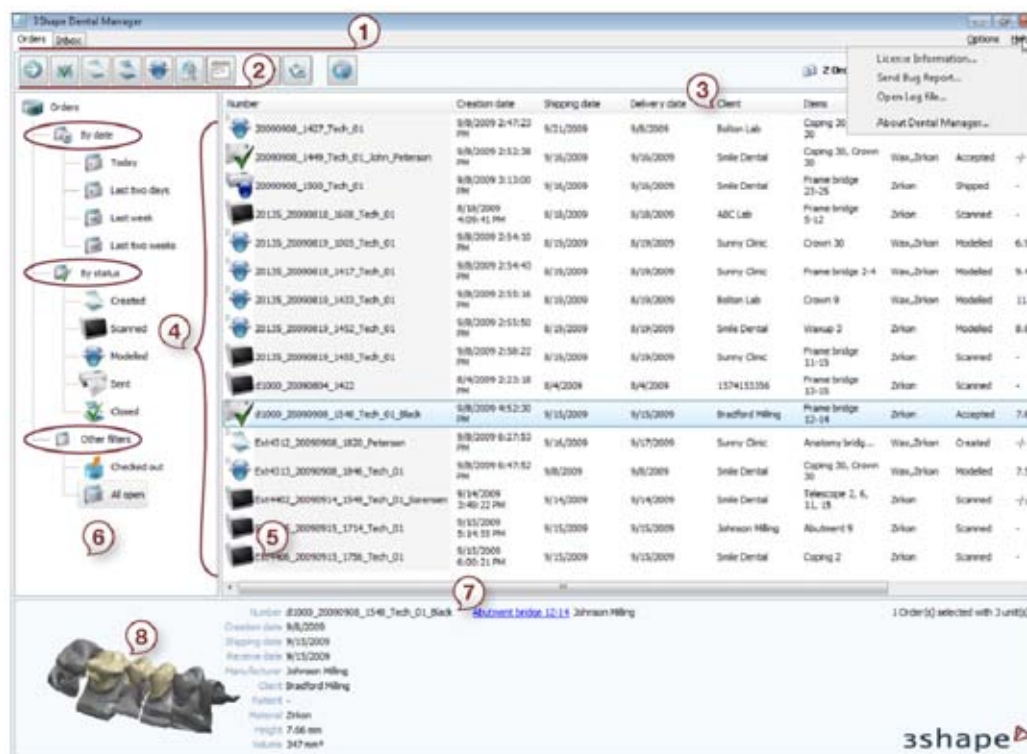


Significant productivity enhancement by order creation, scanning and design taking place in parallel - either with a single or multiple PCs.

2.1 User Interface



Start the application by clicking the DentalManager desktop shortcut. You will be prompted by a window similar to the image below:



1. Main menu
2. Main toolbar
3. Column headers
4. Orders
5. Order status icons
6. Order filter
7. Information on selected Item
8. 3D preview


The **Main Toolbar** includes:

Scan Model 3D preview etc.	<p>Buttons of the workflow process that can change depending on the order and the stage of the process.</p>
Scan Server ScanItLibrary Auto Update Dental System Control Panel	<p>Buttons that bring you to a particular 3Shape program or application and are shown at any stage.</p>




Order Filter - orders in DentalManager can be sorted, searched and displayed by the following categories: **Date**, **Status** and **Other**. For example, if you want to find the orders that have been created last week or that are scanned, click on the corresponding filters.

Orders - the orders you are working with and the ones that are stored under the selected category (**Date**, **Status** and **Other**) are displayed in this window. When you create a new order it appears in the list of orders automatically, showing information about its **Creation date**, **Material** etc.


You can also see the single units of an order and get information about each of them separately (see the image below). This option is very helpful when it comes to production as well as pricing, invoicing, accounting etc. Use the






Orders/Items  button in the Main toolbar to expand/collapse orders or display order items only.

The list view can be sorted for a specific column by clicking on the column headers. The order of the column headers can also be changed: Click on the heading you want to move and drag it to the desired position. To customize the columns (show/hide them in the window), right-click on any column and select/unselect the desired ones.

Number	Creation date	Shipping date	Delivery date	Client
 20090908_1427_Tech_01	9/8/2009 2:47:23 PM	9/21/2009	9/8/2009	Bolton Lab
 20090908_1449_Tech_01_John_Peterson	9/8/2009 2:52:38 PM	9/16/2009	9/16/2009	Smile Dental
 20090908_1500_Tech_01	9/8/2009 3:13:00 PM	9/16/2009	9/16/2009	Smile Dental

To select multiple orders, hold down **Ctrl** or **Shift** and choose the orders you need. Then use the buttons in the Main toolbar or right-click on the selection for further handling.

 d1000_200906... Orders that are not finished before expected delivery date are marked with the **Exp** sign.

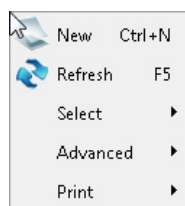
 Created  Scanned  Modelled  Closed  Accepted	Order Status - order status icons change according to the stage of the order processing
--	--


Information on the Selected Item - the information on any order or item you have selected is shown in this window.

3D Preview - a 3D preview of the scan and design of the selected order is displayed here. Click on the scan in the preview and rotate it with the mouse. You can also zoom in and out. If the order was created but has not been scanned yet, you can see the preview of your order as shown in the image at the beginning of this chapter.

2.2 Creating Orders

To create a new order in DentalManager you can do one of the following actions:



- Click on the **New**  button in the Main toolbar
- Right-click in the DentalManager window and select **New** from the menu (see image to the left)
- Use the combination of keys **Ctrl + N**

After you select **New** to create a new order, the Order Form window appears on the screen:

The screenshot shows the 'Order Form' window. It has a sidebar on the left with sections: Lab information (Operator: Tech 01), Customer information (Customer: Sunny Clinic, Contact person: Alexis, Create date: 08.09.2009, Shipping date: 16.09.2009), Patient information (Last name: Peterson, First name: John), and Comments. The main area is divided into Order settings (Order number: Ex14312_20090908_1820_Peterson, Importance: Normal, Design Module: DentalDesigner 2009) and Order details (a dental arch diagram with numbered callouts 1-4). To the right of the arch is the Scan settings section (Object type: Model, Antagonist: Antagonist bite, Face Scan: 3Shape Face Scanner, Neighborhood scan: checked, Double preparation: unchecked, Pre-preparation scan: checked) and a restoration selection panel with options like Wax, Zirkon, Frame, Telescope, Abutment, and Bridge. At the bottom are Scan, OK, and Cancel buttons.

1. Teeth numbering information
2. Teeth overview map
3. Restoration buttons
4. Teeth preview



Note! The amount of displayed fields depends on the settings in the Dental System Control Panel: DSCP -> System Settings -> Order Settings.

2.2.1 Defining Order Details


The following information describes the sections of the Order Form:

Lab information

This field is reserved for the operator's name. You can choose an operator from a list which is created in Dental System Control Panel (see chapter *Operators* for more details).

Customer information

You can add here all the information related to the customer for whom this order is being created. The customer's name can be previously registered in Dental System Control Panel, although now you also have an option to add a

customer directly from the Order form - click on the **Add customer**  button to open up the corresponding page in Dental System Control Panel. Customers (sites) can also be imported to Dental System Control Panel from an Excel file (see chapter *Sites* for more details). Please proceed to *Customer Information* chapter for the detailed description of this section.

Patient Information

In this section of the Order Form you can type in the patient's first and last names. The **Reference** field can be filled in with the customer's social security number or driver's license number or some other information that identifies the customer apart from his name.

Comments

You can add any order related comments here.

Order Settings

This section contains some important information on the order (e.g. **Order number**). The order number is automatically attached to each order and can be defined in Dental System Control Panel. Please proceed to chapter *Order Settings* for the detailed description of this section.

Scan Settings

This section allows you to choose the settings for your order scanning process (e.g. you can choose to scan an antagonist for a more precise result). Please proceed to chapter *Scan Settings* for the detailed description of this section.

Order Details

This section contains:

Teeth Overview Map

This illustration of upper and lower teeth rows helps you create your order. Click on the tooth/teeth you need and select a desired restoration.

Teeth numbering information

When a cursor is moved over a tooth, this field displays the numbering index. The type of index can be selected in Dental System Control Panel (*System Settings -> Miscellaneous -> Tooth Index System*). The default index system is **FDI Notation**.

Teeth Preview

After the type of restoration has been selected, you can see the preview of the tooth by moving the cursor over it (see the image above).

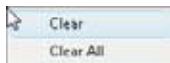
Restoration buttons

These buttons contain information about the nature of restoration to be performed as well as materials, manufactures etc.

To define an order, select the desired tooth/teeth from the **Overview map** by clicking on it with the cursor. The selection will be circled in red. After that, click on one of the restoration buttons to choose the desired operation. The Dental System software allows working in layers. You can easily start with a coping and add a crown on top, for example. Once the relevant restoration is selected the tooth will change its color or shape according to the chosen restoration button. Next to every restoration button you will find menus with different options (material, manufacturer, color etc.).

It is possible to select more than one tooth at a time. Click on several teeth or use the standard **Shift** + left-click to select a row of teeth. A multiple selection allows bridges to be applied.

Right-click on the selected teeth in the **Overview map** to clear your selection.



Click **OK** when the order has been set up as desired. The order is stored into the database and handled by DentalManager. Click **Scan** to start scanning immediately. Click **Cancel** to terminate the order definition.

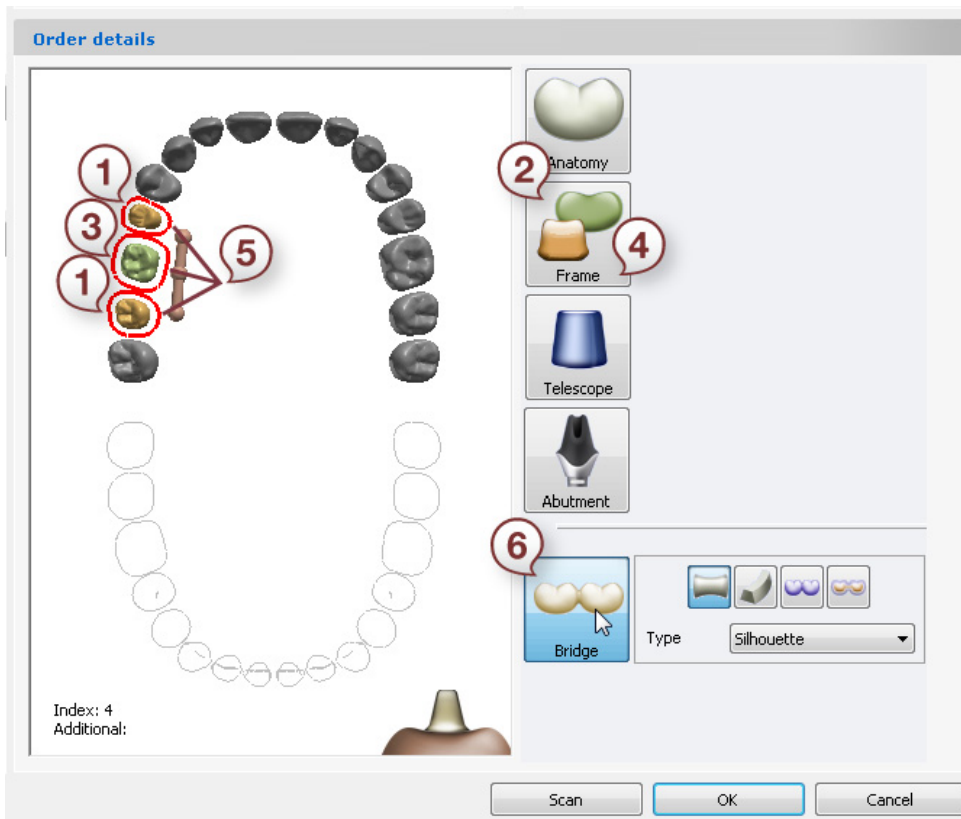
2.2.1.1 Single Coping



1. Select preparation in the teeth overview.

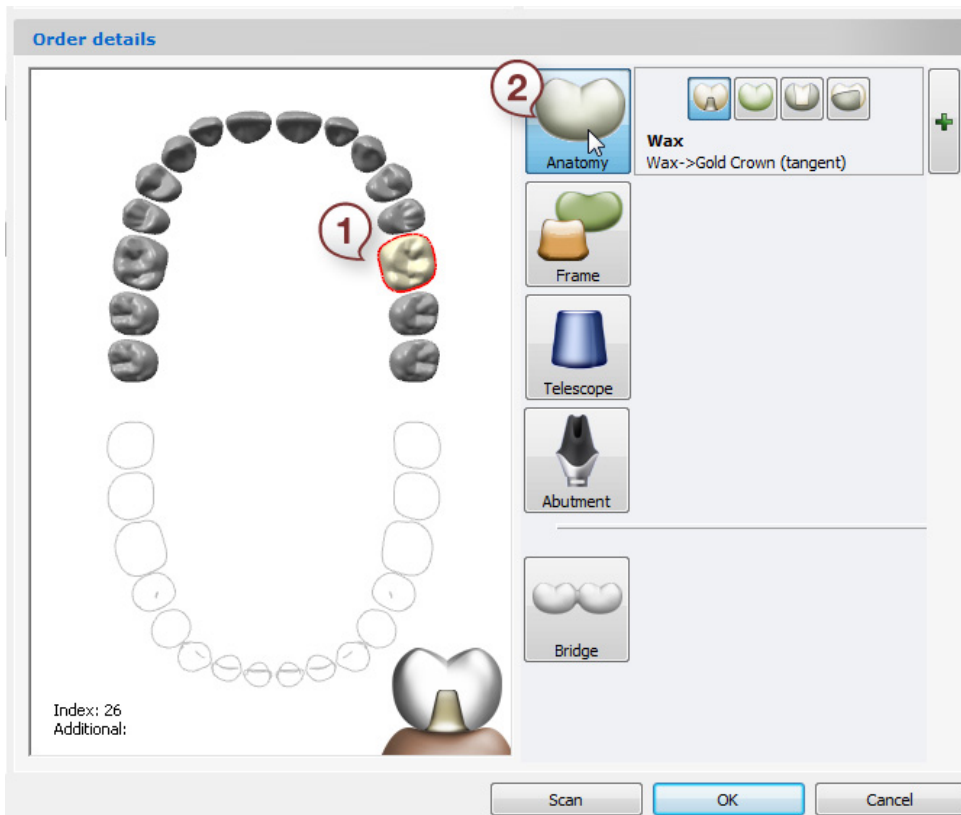
2. Click the **Frame** button.

2.2.1.2 Bridge Framework



1. Select preparations in the teeth overview.
2. Click the **Frame** button.
3. Select pontic in the teeth overview.
4. Click the **Frame** button and select a library pontic.
5. Select all units in the bridge of the teeth overview.
6. Click the **Bridge** button.

2.2.1.3 Full Anatomical Crown



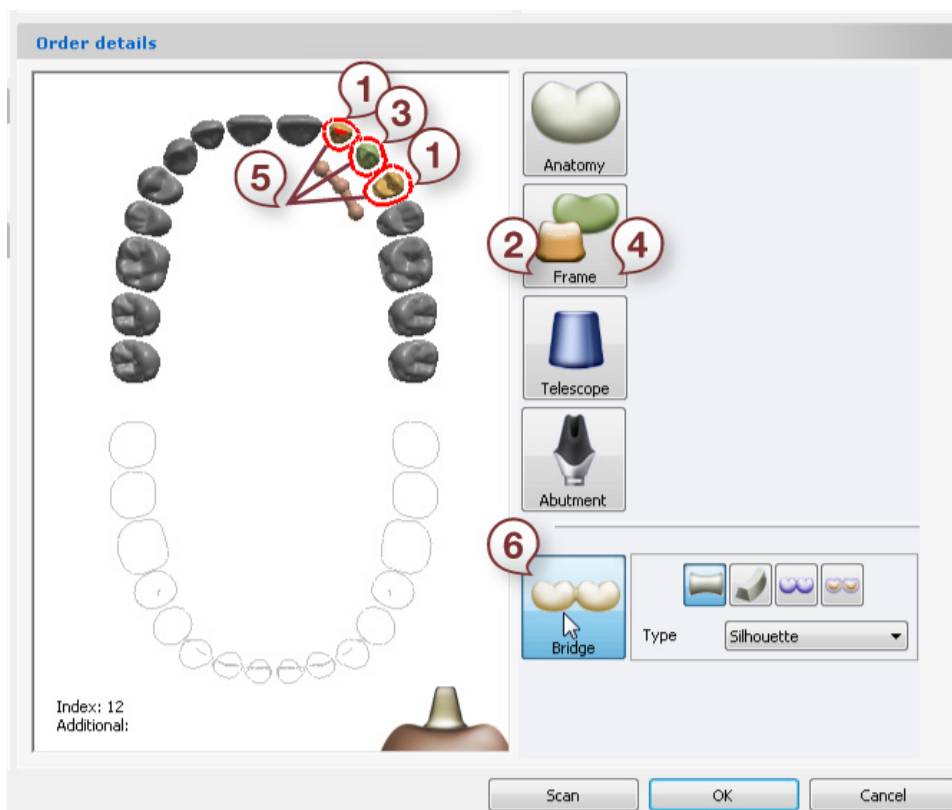
1. Select preparation in the teeth overview.
2. Click the **Anatomy** button.

2.2.1.4 Full Anatomical Bridge



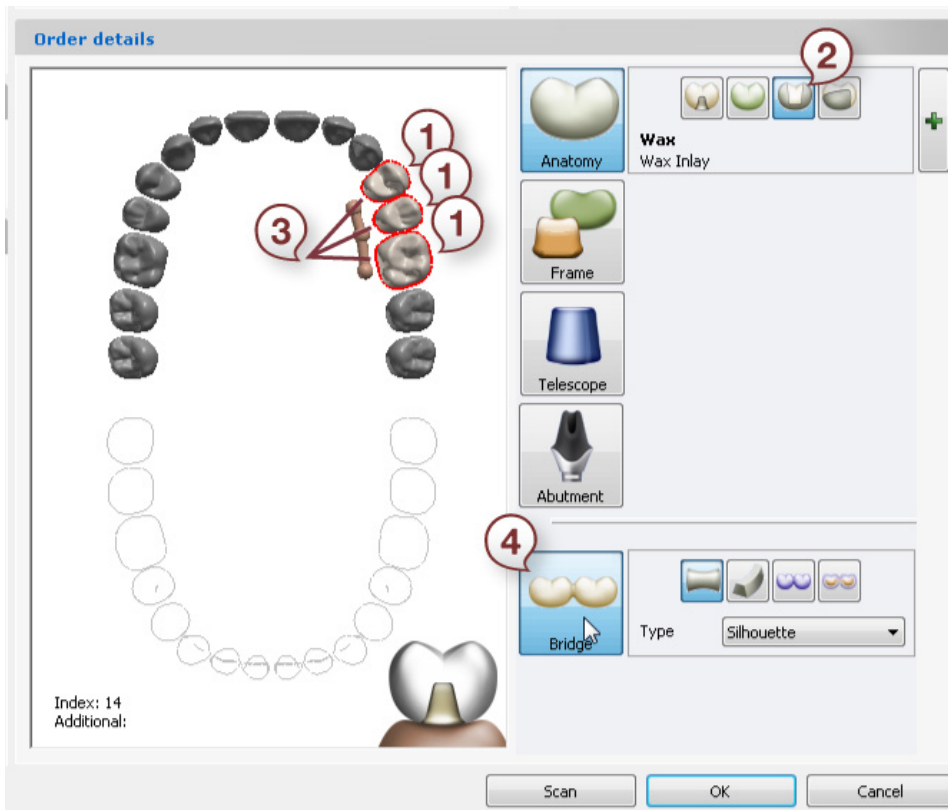
1. Select preparations in the teeth overview.
2. Click the **Anatomy** button.
3. Select pontic in the teeth overview.
4. Click the **Anatomy** button and select crown pontic.
5. Select all units in bridge in the teeth overview.
6. Click the **Bridge** button.

2.2.1.5 Anatomical Copings and Framework



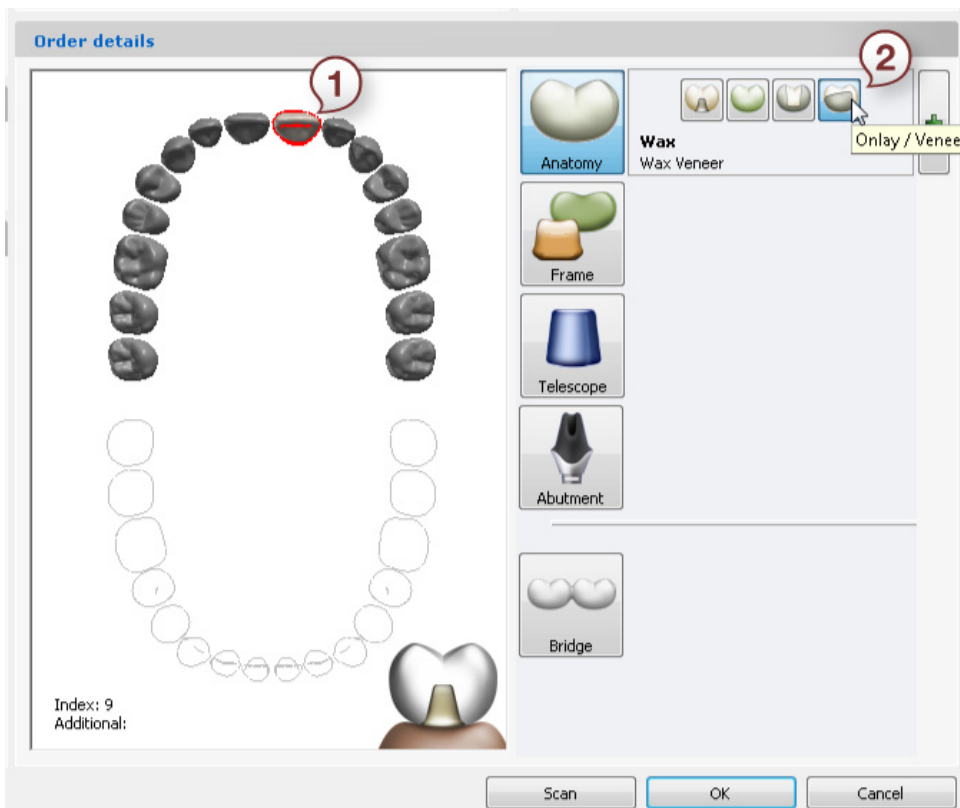
1. Select preparations in the teeth overview.
2. Click the **Frame** button and select an anatomical coping.
3. Select pontic in the teeth overview.
4. Click the **Frame** button and select an anatomical pontic.
5. Select all units in bridge in the teeth overview.
6. Click the **Bridge** button.

2.2.1.6 Inlay/Inlay Bridge



1. Select preparations in the teeth overview.
2. Click the **Anatomy** button and select an inlay.
3. Select all units in bridge in the teeth overview.
4. Click the **Bridge** button.

2.2.1.7 Onlay/Veneers



1. Select preparation in the teeth overview.
2. Click the **Anatomy** button and select an onlay/veneer.

2.2.1.8 Over-pressed Crowns and Bridges



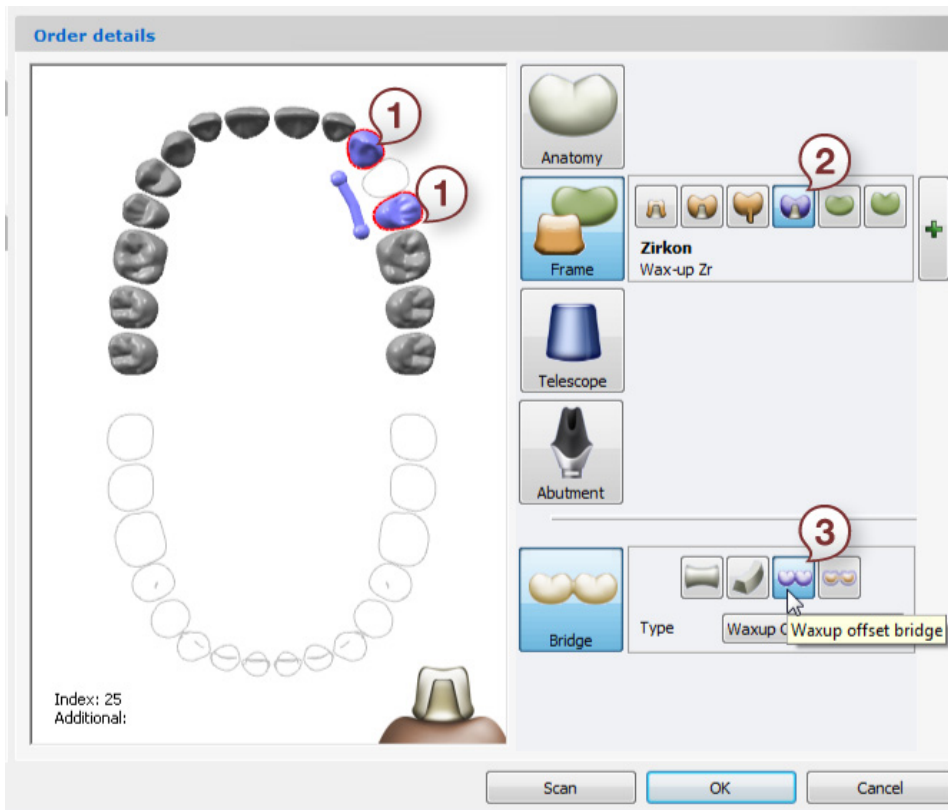
1. Select preparations in the teeth overview.
2. Click the **Frame** button.
3. Click the **Anatomy** button
4. Select pontic in the teeth overview.
5. Click the **Frame** button and select a library pontic.
6. Click the **Anatomy** button
7. Select all units in bridge in the teeth overview.
8. Click the **Bridge** button.

2.2.1.9 Single Wax-up



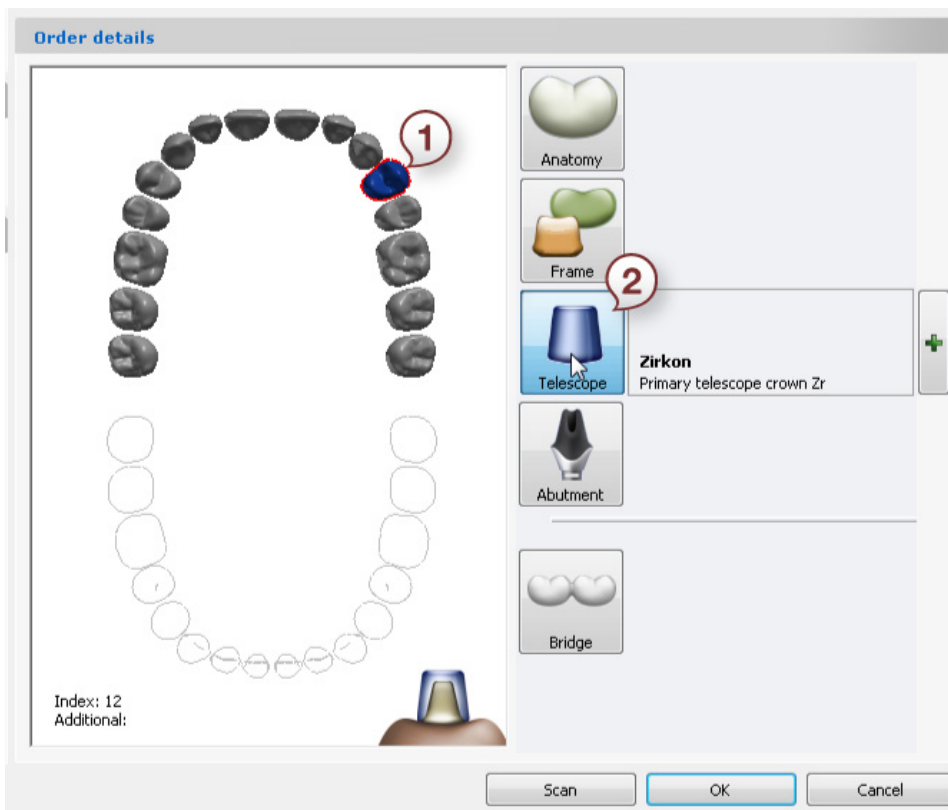
1. Select preparation in the teeth overview.
2. Click the **Frame** button and select a wax-up.

2.2.1.10 Wax-up Bridge



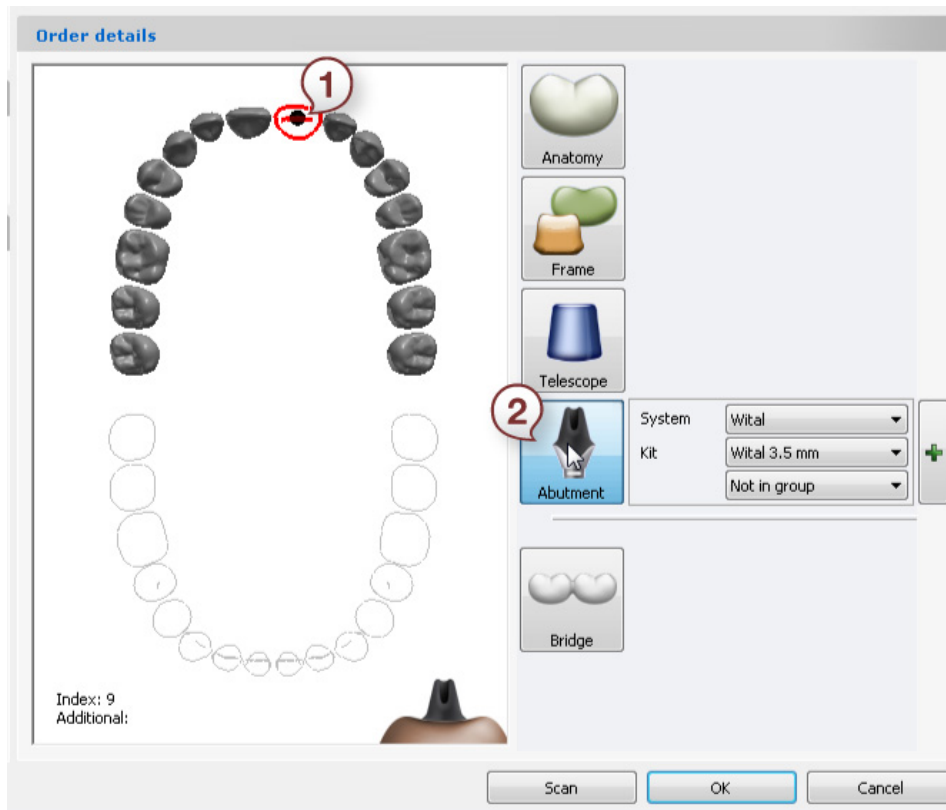
1. Select preparations in the teeth overview.
2. Click the **Frame** button and select a wax-up.
3. Click the **Bridge** button and select a wax-up bridge.

2.2.1.11 Telescope



1. Select preparation in the teeth overview.
2. Click the **Telescope** button.

2.2.1.12 Customized Abutments



1. Select preparations in the teeth overview.
2. Click the **Abutment** button.

The process of defining an order for the customized abutment design is identical to the one used with the other types of restoration, but demands attention to some additional details in defining the order settings.

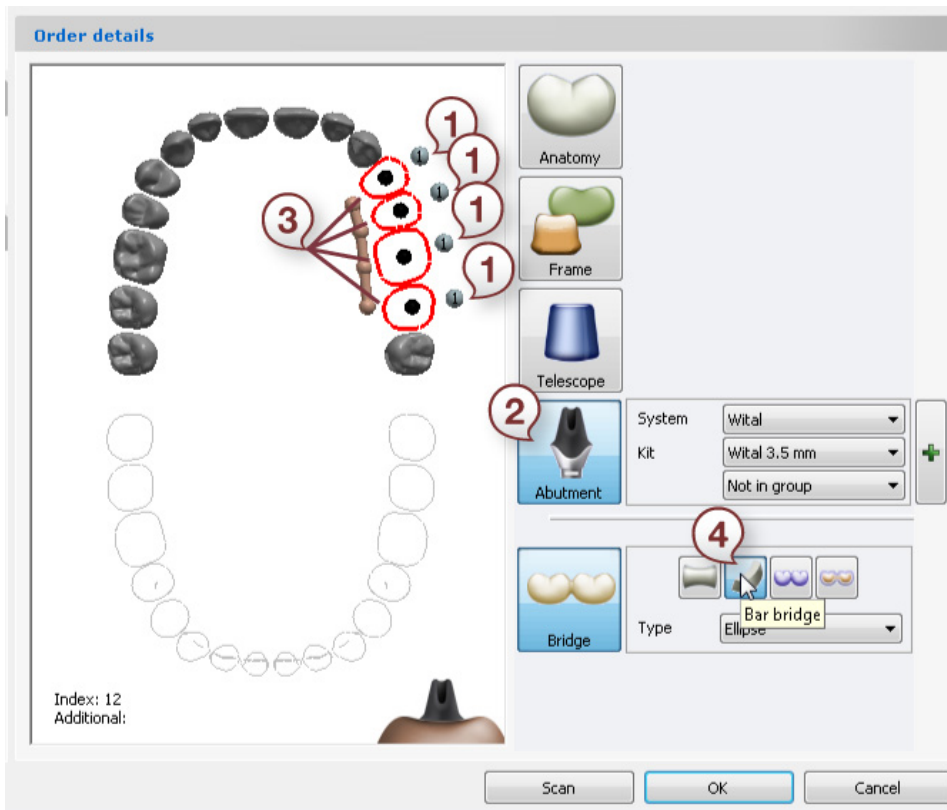
Next to the **Abutment** button you see menus with different options which are to be selected manually, such as type of system and type of kit within this system used in the abutment restoration. Crucially, the type of kit selected depends fully on the given scan abutment configuration.

Specifying an implant kit (i.e. the scan abutment type to look for) will guide the system throughout the scanning process. If the implant kit type does not correspond to the type of the scan abutment detected during the scanning process, this will result in the system failure to process the order further.

Please see chapter Abutments for more details on implant systems and abutment kits.

Abutments can be arranged in groups with each group having its common insertion direction. This allows to model upper structures on top of customized abutments: the resulting customized abutments will be in parallel by default (as long as the Top cap is not rotated during the modelling). In order to define a group, select the desired teeth with the cursor and choose **Create Group** from the **Abutment** drop-down menu. Should a second group of abutments be created, it would have an incremental number. Select **Ungroup** or **Ungroup all** to delete one or all groups. You can define (and later on design) items on top of the abutments.

2.2.1.13 Implant Bars and Bridges



1. Select preparations
In the teeth overview.
2. Click the **Abutment**
button.
3. Select all units
in bridge in the teeth
overview.
4. Click the **Bridge**
button and select a
bar bridge.



1. Select preparations in
the teeth overview.
2. Click the **Abutment**
button.
3. Select pontic in the
teeth overview.
4. Click the **Frame**
button and select a
pontic.
5. Select all units in
bridge in the teeth
overview.
6. Click the **Bridge**
button.

2.2.1.14 Post & Core



1. Select preparation in the teeth overview.
2. Click the **Frame** button and select post and core.

2.2.1.15 Select Material and Manufacturer



After you have defined your order you can click on this button to choose the material for your restoration, it's type and color as well as the manufacturer and the manufacturing process.

All the settings in this form are predefined in Dental System Control Panel and can be edited from there.

Material - choose restoration material.

Manufacturing process - select the set of settings for a specific machine.

Manufacturer - you can choose yourself as a manufacturer or another site/manufacturer.

Type - choose the material type.


Color - select the material color.

Material:	Zirkon
Manufacturing process:	Milling R0.4mm
Manufacturer:	Johnson Milling
Type:	Zr Coping (tangent)
Color:	A1

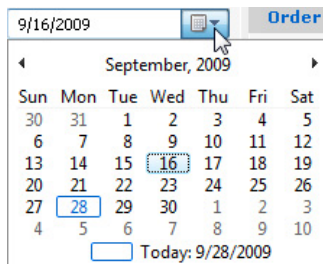
2.2.2 Customer Information

Customer information	
Customer:	Sunny Clinic
Contact person:	Alexis
Create date:	08.09.2009
Shipping date:	16.09.2009

Customer - name of the customer for whom the order is created (if it's a manufacturing center though, this will be the lab sending the order). The customer's name (the site) can be previously registered and further modified in Dental System Control Panel (DSCP -> Site Settings -> Sites). You also have the option of adding a customer directly from the

Order form - click the **Add customer**  button to open up the corresponding page in Dental System Control Panel. Click on **Add** and fill in the necessary fields as described in chapter sites. You can create a list of sites and modify it at any time (add, delete, move up/down etc.).

Contact Person - you can indicate the name of a person from customer's side who can be reached and referred to if needed.



Create/Shipping/Delivery dates - to select the date of creation, shipping or delivery of an order, click on the corresponding combo-box and pick a date from a drop-down calendar. These dates are automatically updated depending on when the milling center receives the order and what the order consists of.

Delivery Type - this is a possibility to indicate how the finished design should be sent back to the customer, e.g. "Shipped by UPS" etc.

Ship to different address - if you want the order to be shipped to some other specific location, check this box and fill in the blanks with the information on a new address.

2.2.3 Order Settings

Order Number - is a unique combination of parameters, which is automatically attached to each order and can be defined in Dental System Control Panel (DSCP -> System Settings -> Order Form Settings).

You can choose the way your order number is reflected in the Order Form (e.g. first goes SiteID, then Date, Operator, Patient's last name etc.). Select **Unspecified** if you don't want a parameter to be seen in the order number.

External Order Number - if you want the external ID to be added to the order number, select **External OrderId** from the drop-down menu in Dental System Control Panel (DSCP -> System Settings -> Order Form Settings -> Define template for order-ID generation) and type the number in the Order Form. It will be automatically added to the order number.

Importance - choose between **Low**, **Normal** or **High** options to indicate the level of importance for the order.

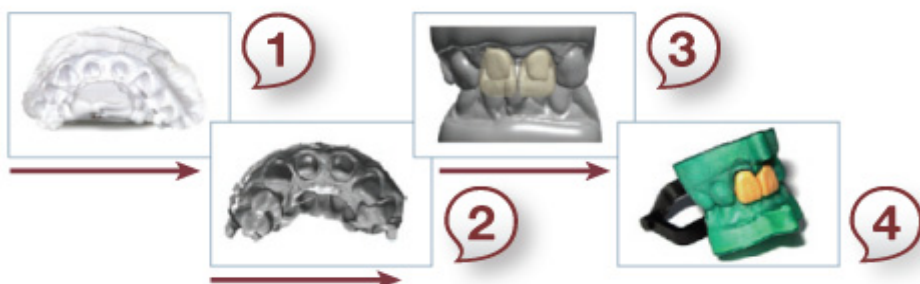
Design Module - you can choose here between DentalDesigner 2008 and DentalDesigner 2009 depending on your preferences. This option is very convenient, since you can choose to use the familiar to you version even after upgrading.

2.2.4 Scan Settings

Object Type - choose the type of object to be scanned - **Impression** or **Model**.

The D700 scanner delivers high quality **impression scans**. Direct scanning of silicone and alginate impressions represents a unique opportunity for work process optimization and cost saving to labs and large-scale dentists.

The turnaround time is reduced by instantly going from physical impression to a high accuracy digital model:



1. Physical impression
2. Digitalscan
3. Virtual model creation & CAD
4. Physical model

Antagonist - you can scan an antagonist to get a more precise result. Choose between **Antagonist bite** and **Antagonist model** or select **None** if you do not want to scan the antagonist.

Face scan - the new 3Shape Dental Face Scanning solution allows the dentist or lab to visualize and interactively update the planned dental treatment with the patient. The pre-treatment visualization is achieved by combining 3D scans of the patient's face and teeth, and importing these into 3Shape's Dental System.

Double Preparation - allows scanning of additional information (e.g. in order to design and scan the desired framework in wax).

Neighborhood Scan - select this check-box to get the scan of the neighbouring teeth for the additional model information (e.g. proximal contact points).




Pre-preparation Scan - the pre-preparation model and diagnostic wax-up contain very valuable information for modeling of full anatomical crowns and general restorative work. Hence the pre-preparation model and diagnostic wax-up can now be scanned and aligned to the normal preparation scan and visualized during the design phase.

2.3 Modifying Orders

Orders that have been created but not scanned yet can be modified as described below. However, if their status is **Scanned** or one of the further statuses, the order can be opened in Read-Only mode (except for the Manufacturer which might be changed later on).

To modify an order:


- Click on the  button in the Main toolbar or
- Left-click on the order and select **Modify** from the menu.

Modifying the existing orders can be very useful, for example, when you want to select another remote manufacturer (this can be also done after the design is completed) or scanning an impression instead of a model, etc.

2.4 Handling Orders in DentalManager

2.4.1 Scanning an Order

Follow the steps below to scan an order with status **Created**:

1. Select an order you need to scan and perform one of the following actions:
 - select **Scan**  button from the Main toolbar or
 - right-click on the order and select **Scan** or
 - double-click on the order (it will automatically bring you to the next step - scanning).
2. When ScanItRestoration or ScanItImpression application opens up, follow the instructions to successfully perform scanning.

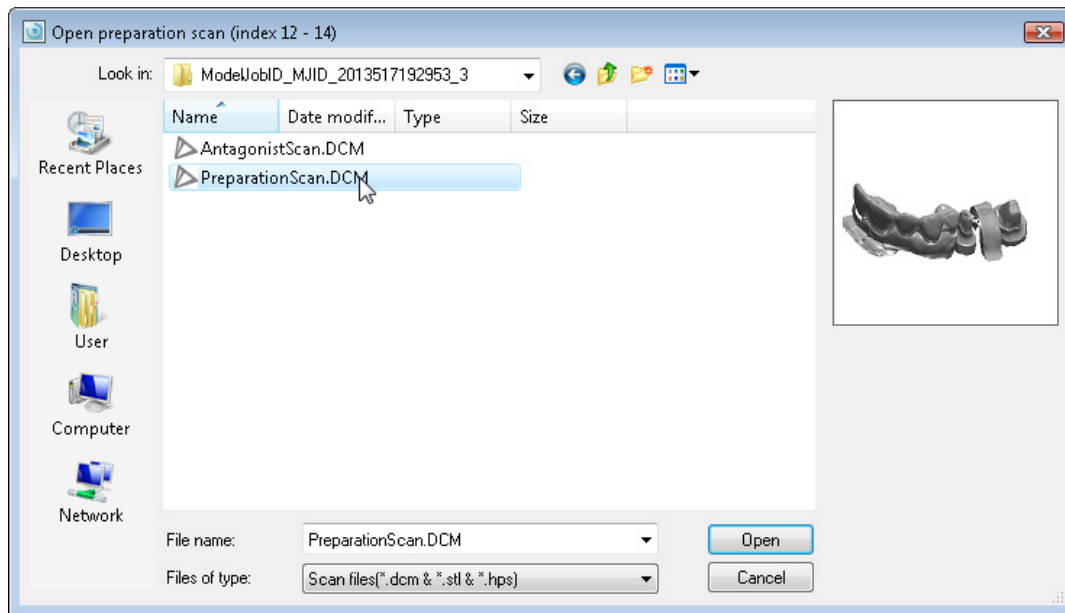
After scanning the order receives status **Scanned**.

The scanning applications can now remain open for the coming order after completing a specific order, which improves the speed of the whole process.

Please see *scanItRestoration* chapter for more details on how to scan an order.

2.4.2 Import Scan

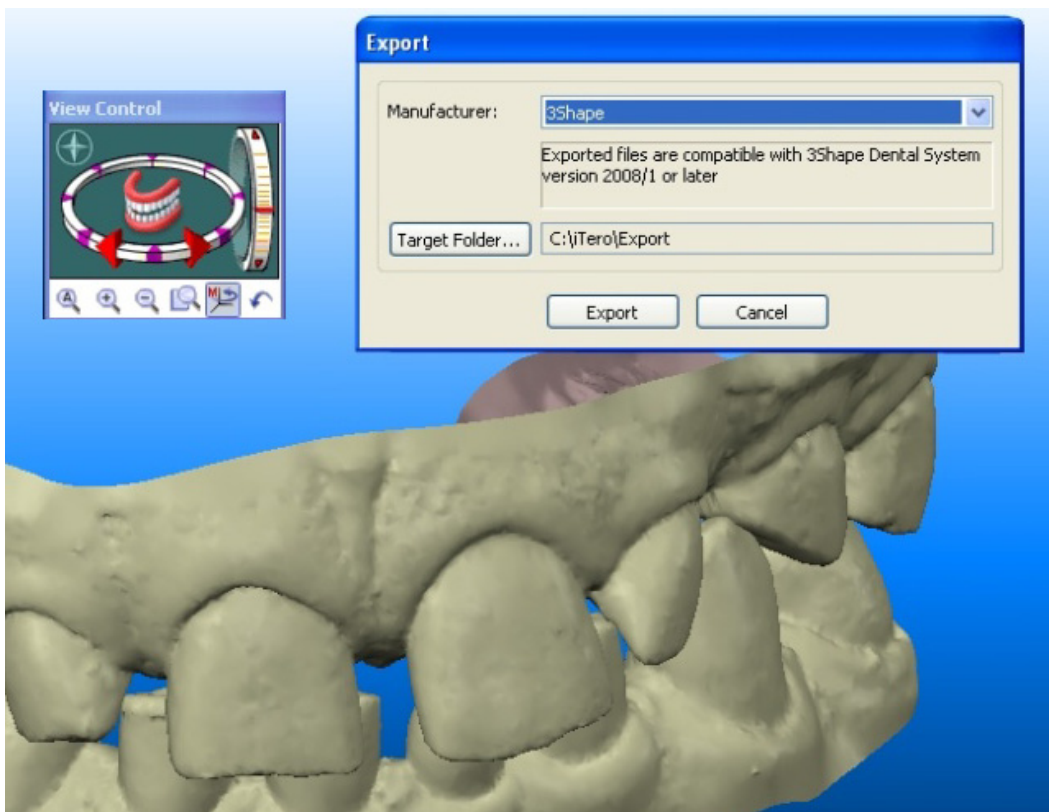
As an alternative to using ScanItRestoration, the scan can be imported to the system. Right-click on the order and select **Import Scan**. When the **Open Scan** dialog appears, select the requested scans and click **Open**.



2.4.3 Imported Scans from Intra Oral Scanners

It is possible for 3Shape software users to import and work directly on scans from open intra oral scanners such as Itero.

To use Itero scan it is necessary to properly export it from the Itero lab software:




1. Manually create an order in DentalManager matching the Itero order.
2. Import the scan by right clicking on the order and selecting **Import Scan**.
3. Browse the scan file exported from Itero (the path can be seen above).
4. Continue as normal.

2.4.4 Modeling an Order

Follow the steps below to model the order with status **Scanned**:

1. Choose an order you need to model and perform one of the following actions:

- select **Model**  button from the Main toolbar or
- right-click on the order and select **Model** or
- double-click on the order (it will automatically bring you to the next step, which is modeling in this case).

2. When DentalDesigner application opens up, follow the instructions to successfully perform order modeling.

After the modeling process the order receives status **Modeled**.

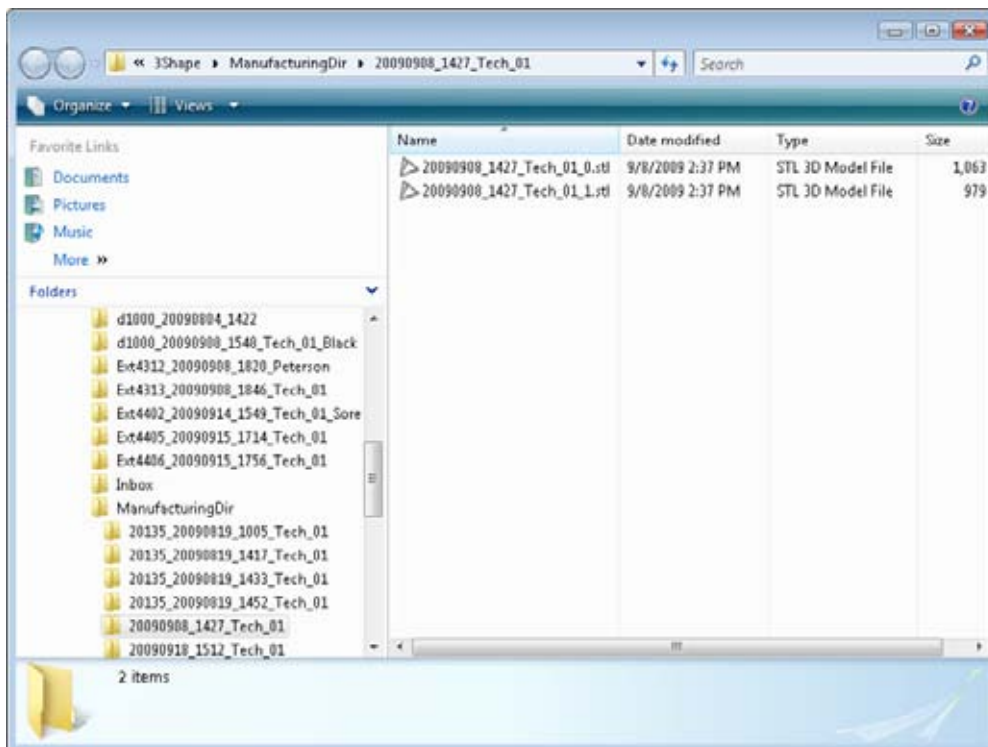
The DentalDesigner applications can remain open for the coming order after completing a specific order, which improves the speed of the whole process.

Please see *DentalDesigner* chapter for more details on how to model an order.

2.4.5 Manufacturing Orders

2.4.5.1 Manual Handling of Manufacturing Files

If manufacturing is allowed at the site then manufacturing files can be accessed in Windows Explorer started from DentalManager using the combination of keys **Shift+F4**. These files are created automatically if local manufacturing is chosen, but if it is remote manufacturing, then the **F7** key needs to be pressed. By clicking the **F7** key, you Generate CAM output (which can be also accessed in the **Advanced** tab when you right-click on the order). After the CAM output.



Manufacturing folder of the order including the STL output files.

2.4.5.2 Remote Manufacturing of Orders

Material:	<input type="text" value="Zirkon"/>
Manufacturing process:	<input type="text" value="Milling R0.4mm"/>
Manufacturer:	<input type="text" value="Johnson Milling"/>
Type:	<input type="text" value="Zr Coping (tangent)"/>
Color:	<input type="text" value="A1"/>

Orders that have status **Scanned** or **Modeled** can be sent to a remote manufacturer (milling center) using DentalManager. To do so you have to specify the **Manufacturer** in the Order form (see the image to the left).

You can Add/Edit/Delete manufactures in Dental System Control Panel (DSCP -> Site Settings -> Sites).

To add a manufacturer in Dental System Control Panel click on  **Add**, type in the **Name** and **FTP IP address** and

check the **Has CAM** check-box  **Has CAM** .

You have to specify also the **Manufacturing process** in the Order Form (see the image above). To Add/Edit/Delete manufacturing process go to Dental System Control *DSCP* -> *Site Settings* -> *Manufacturing process*.




It is important, that the manufacturer you created and specified in Order form (in our case it is **Johnson Milling**) is selected for the manufacturing process you are using (in our case it is **Milling R0.4mm**). Go to **Manufacturing process** in Dental System Control Panel and check the necessary manufacturer (see the image to the left).

Important:

- The **easiest way of adding manufacturers** is if the connection between the lab and the manufacturer has been defined in the Site Connection Administration application – in this case you only need to click “Import site(s) from Server” in Dental System Control. Please refer to your local 3Shape dealer/distributor/OEM partner if you want to use this functionality to connect to a milling center.
- **If manual adding** is done, then it is necessary that both the lab and the manufacturer have each other in the site lists in Dental System Control, and that the IDs are correct.
- The lab should preferably **synchronize his material settings** with those from the milling center; this can now be done by importing the materials settings exported by the manufacturer.
- The lab can **choose another manufacturer** AFTER scanning/modeling the order. This is very practical if the originally chosen manufacturer is for some reason not able to do the work.

Using the Inbox, the Manufacturers are able to send out the parts of their material file that specifies production parameters, e.g. drill radius and minimum material thicknesses (this functionality is called the **Manufacturing Network**). The Manufacturers are also able to import new materials used in a received order as part of accepting the order for production.

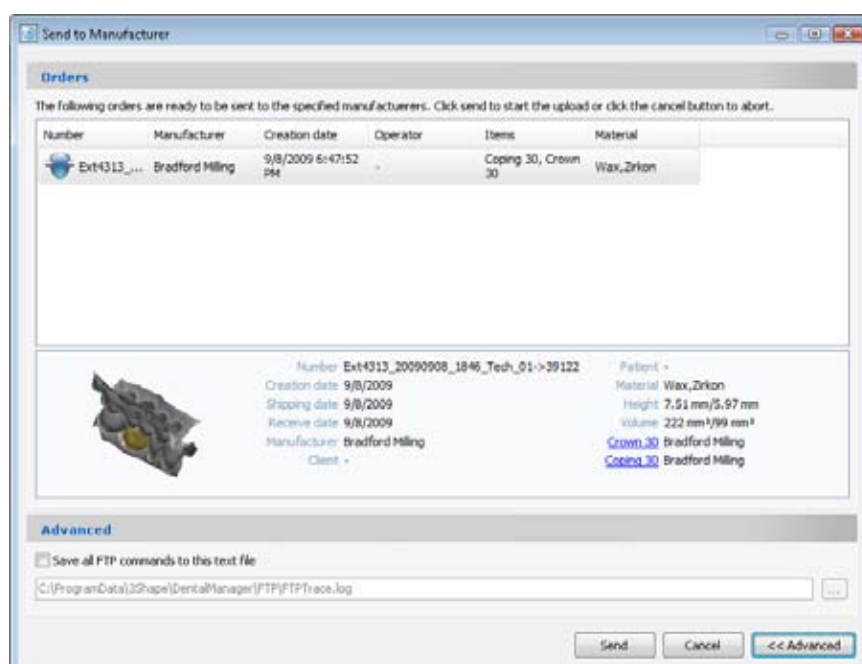
After configuring settings in Dental System Control and filling in the Order form, scan and/or model your order and send it to the manufacturer. To do so:

- right-click on the order and select **Send to Manufacturer** or
- click on  in the Main toolbar.

You will be prompted by the window similar to the one below. Click **Send** to upload the order and then close the window.

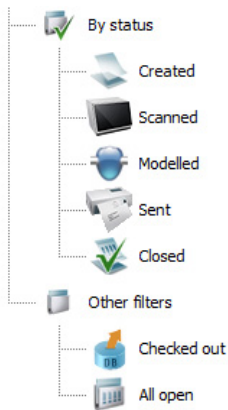


Note! More than one order can be selected and sent simultaneously.



Please see *Inbox Add-On Module* chapter for more details.

2.4.5.3 Closing Orders



Once orders have been produced by the manufacturer and shipped back to the end-user, the orders are ready to be closed. Closed orders are still accessible through the **Closed** filter.



Hint! It is recommended to close orders since too many orders in the **Modelled** filter will lead to slower DentalManager performance when opening this filter. Also, you can specify the number of orders to be displayed by default in Dental System Control Panel (DSCP -> DentalManager -> General).

2.5 Additional Options

2.5.1 Finding Orders

There are several ways of finding existing orders in DentalManager:

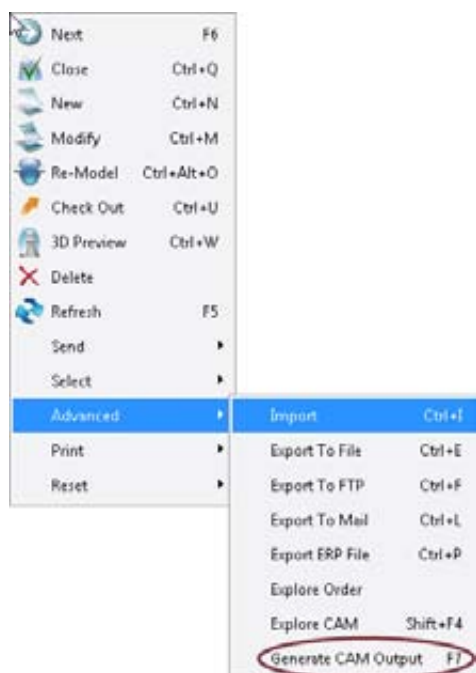
- Using the **Search** field located in the upper right corner of the main window. Click on the little black arrow next to the magnifying glass to select search criteria;
- Using the filters that are located in the left part of the main window (the last search is always stored in the **Search** filter);
- By selecting the specific columns (e.g. order number, creation date etc.).

The screenshot shows the 3shape Dental Manager interface. On the left, there is a sidebar with filters: 'By date' (Today, Last two days, Last week, Last two weeks), 'By status' (Created, Scanned, Modelled, Sent, Closed), and 'Other filters' (Checked out, All open). The main window displays a table of orders with columns: Number, Creation date, Shipping date, Delivery date, Client, and Items. A search bar is located in the top right corner. A dropdown menu is open next to the search bar, showing search criteria options: Number, Creation date, Shipping date, Delivery date, Client, Items, Status, Material, Height, Manufacturer, Client identification, and Client order number. The bottom of the window shows a detailed view of a selected order, including its number, creation date, shipping date, receive date, manufacturer, client, patient name, material, height, and volume.

Number	Creation date	Shipping date	Delivery date	Client	Items
20090908_1407_Tech_01	9/8/2009 2:43:33 PM	9/11/2009	9/10/2009	Boston Lab	Coping 30, Crown 30
20090908_1448_Tech_01_John_Peterson	9/8/2009 2:52:38 PM	9/15/2009	9/15/2009	Smile Dental	Coping 30, Crown 30
20090908_1506_Tech_01	9/8/2009 3:13:00 PM	9/15/2009	9/15/2009	Smile Dental	Frame bridge 23-25
20135_20090818_1608_Tech_01	8/18/2009 4:09:41 PM	8/18/2009	8/18/2009	ABC Lab	Frame bridge 9-12
20135_20090819_1005_Tech_01	9/8/2009 2:54:10 PM	8/19/2009	8/19/2009	Sunny Clinic	Crown 30
20135_20090819_1417_Tech_01	9/8/2009 2:54:43 PM	8/19/2009	8/19/2009	Sunny Clinic	Frame bridge 2-4
20135_20090819_1433_Tech_01	9/8/2009 2:55:16 PM	8/19/2009	8/19/2009	Boston Lab	Crown 9
20135_20090819_1452_Tech_01	9/8/2009 2:55:50 PM	8/19/2009	8/19/2009	Smile Dental	Waxup 3
20135_20090819_1455_Tech_01	9/8/2009 2:58:22 PM	8/19/2009	8/19/2009	Sunny Clinic	Frame bridge 11-15
d1000_20090904_1422	9/4/2009 2:23:18 PM	9/4/2009	9/4/2009	1574153286	Frame bridge 13-15
d1000_20090908_1548_Tech_01_Black	9/8/2009 4:52:30 PM	9/15/2009	9/15/2009	Bradford Hilling	Frame bridge 12-14
Ext4012_20090908_1829_Peterson	9/8/2009 6:27:53 PM	9/17/2009	9/17/2009	Sunny Clinic	Anatomy bridge 11
Ext4013_20090908_1846_Tech_01	9/8/2009 6:47:52 PM	9/8/2009	9/8/2009	Smile Dental	Coping 30, Crown 30
Ext4402_20090914_1549_Tech_01_Sorensen	9/14/2009 3:49:22 PM	9/14/2009	9/14/2009	Smile Dental	Telescop 2, 6, 11, 15
Ext4405_20090915_1714_Tech_01	9/15/2009 5:14:55 PM	9/15/2009	9/15/2009	Johnson Hilling	Abutment 9
Ext4406_20090915_1756_Tech_01	9/15/2009 6:00:21 PM	9/15/2009	9/15/2009	Smile Dental	Coping 2

Number: d1000_20090908_1548_Tech_01_Black
Creation date: 9/8/2009
Shipping date: 9/15/2009
Receive date: 9/15/2009
Manufacturer: Johnson Hilling
Client: Bradford Hilling
Patient: -
Material: Zirkon
Height: 7.66 mm
Volume: 347 mm³

2.5.2 Generate CAM Output



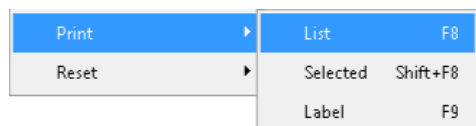
Depending on the purchase conditions, 3Shape Dental System's output can be used with any third party rapid prototyping/milling machines which accepts STL files as input (please contact your local 3Shape dealer for more details).

Usually, 3Shape Dental System is bundled as OEM component along with rapid prototyping/milling machines whose specific output is generated according to vendor's specification. Please refer to your local 3Shape dealer/distributor/OEM partner for assistance on production related issue.

The **Generate CAM output** function is used to have the modeling exported in a file format which is suitable for production (typically STL or other proprietary 3D file formats). The term "CAM output" is used as different production machines may require different kinds of output and 3Shape Dental System supports a number of them.

It is possible to generate CAM output from the **Modelled** orders if it is supported by the current DentalManager system. In this case it can be accessed from the advanced tab when you right-click on the order (if the order is for local manufacturing, i.e. the Manufacturer chosen in the Order Form is the site itself, then CAM output is created directly from DentalDesigner).

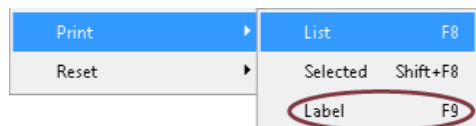
2.5.3 Print Contents and Labels



The current view of orders can be printed on a standard Printer. Right-click on the order and select *Print -> List* from the menu or hit the **F8** function key.

The orders are printed out in the form of a table as shown below:

Number	Creation date	Delivery date	Client	Items	Material	Status	Height
d1000_20090707_1045_Tech_01	7/7/2009 11:29:09 AM	7/13/2009	-	Crown 12, 22, Frame bridge 12-22	Wax,Zirkon	Created	-/-
d1000_20090707_1123_Tech_01	7/7/2009 11:24:05 AM	7/14/2009	Lab	Coping 22, 23	Zirkon	Scanned	-/-
d1000_20090707_1124_Tech_01	7/7/2009 11:24:45 AM	7/7/2009	Mnf	Coping 22	Zirkon	Modelled	9.22 mm



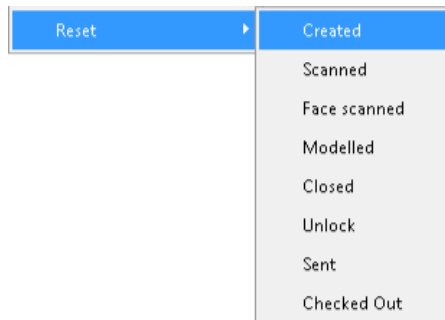
Labels for the selected orders can be printed by selecting *Print -> Label* from the right-click menu or by hitting the **F9** function key. The labels are printed with the printer that is selected in *Options -> Label Printer Settings*. The default layout is designed for 40x40 mm labels as shown on next page:

Client: Smile Dental
Order ID: 200910011447
Type: Coping
Material: Zirkon
Batch ID: -



40 x 40 mm

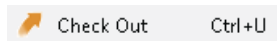
2.5.4 Other



Reset Orders - in some cases it is necessary to reset the status of an order.

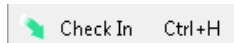
For example, your order is **Modelled** but you need to have it **Scanned** in order to make some changes.

To reset an order, right-click on it and select **Reset**. Then choose the status you need.

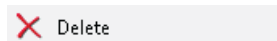


Check-Out Orders - Orders are allowed to be modelled on a computer which is not part of the Dental System, e.g. on a laptop which is brought home (this requires an additional dongle; orders need to be properly exported from the Dental System database, and later re-imported).

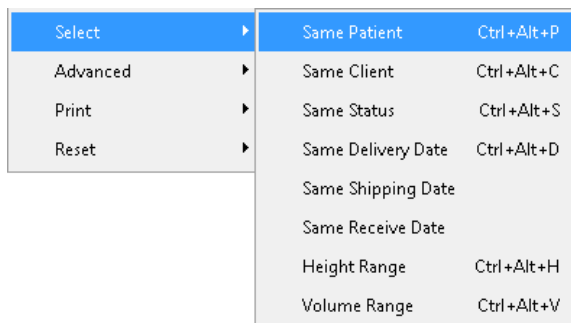
Select desired orders and choose **Check Out** from the right-click menu. When the orders have been processed, they can be re-imported into the Dental System database.



Select the orders ready for check-in and select **Check In**. The orders will be integrated and status updated. After clicking both **Check Out** and **Check In** you will be prompted by a window **Browse for Folder** to select a folder for storing order copies.



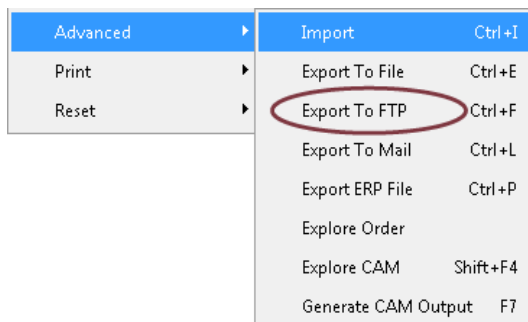
Deleting orders - you can delete an order at any time (if it is not locked). Right-click on the order and select **Delete**. You will be prompted by the confirmation dialog.



Select Orders with common values - orders that have common values (e.g. they have the same status or client) can be selected as a group to assist order handling.

For example, you can select all the orders that have the same patient.

To select orders with common values, right-click on one of the orders and go to Select. Choose one of the suggested parameters.



Export Orders - orders can be exported from the system to a file, FTP or mail.

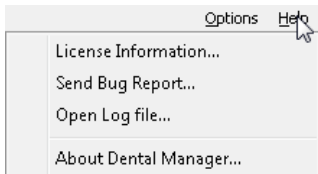
The selected orders are compressed and handed to the desired export control.

To perform the action, right-click on the order, go to the **Advanced** tab and select the desired option.

2.6 Inbox Add-On Module

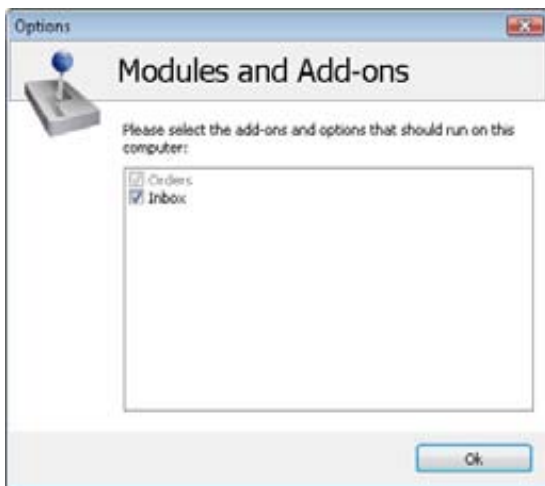
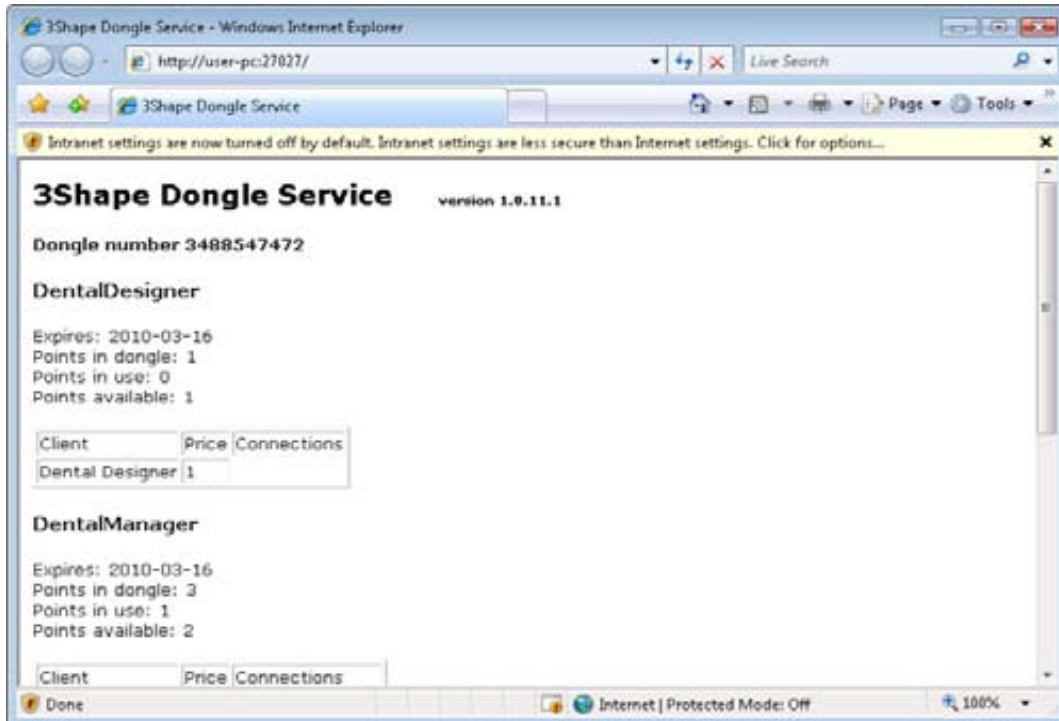
The DentalManager Inbox add-on module allows laboratories/sites to send orders to the Inbox and the production facilities to collect orders from it.

Using the Inbox, the Manufacturers are able to send out the parts of their material file that specifies production parameters, e.g. drill radius and minimum material thicknesses (this functionality is called the **Manufacturing Network**). The Manufacturers are also able to import new materials used in a received order as part of accepting the order for production.



The availability of the Inbox module can be viewed from the License Information page opened via the application *Help* menu.

The License Information page (see image below) displays information on the dongle. It is possible to check for dongle updates or show the server log file by clicking the corresponding buttons at the bottom of the page.

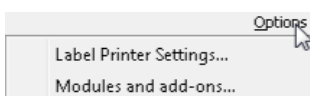


The **Inbox add-on module** supports multiple FTP servers for high-load centralised production. The functionality requires correct FTP settings at the orders sending sites and properly configured FTP server at the orders receiving sites.

There is no need for the FTP server to run on the same PC with the DentalManager Inbox Add-on module.

The DentalManager Inbox Add-on module fetches orders to the FTP server using the FTP protocol.

At least one account needs to be created on the FTP server with "full control" permissions since the data in the FTP account is going to be manipulated with: created, read, modified and deleted.



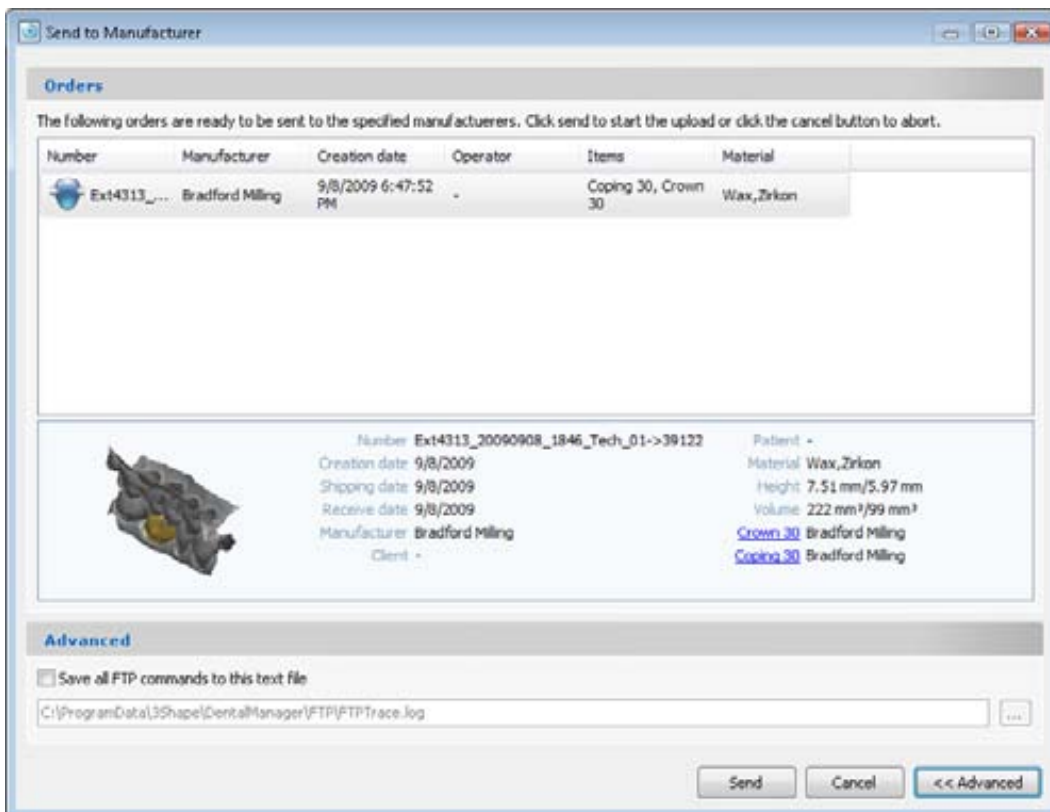
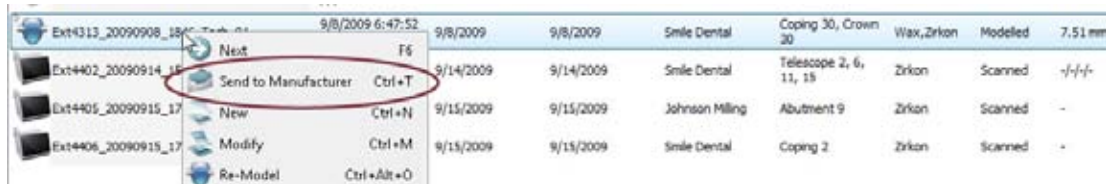
When licensed, the Inbox Add-on module can be enabled via the Options menu.

2.6.1 Sending Orders from the Lab

The orders created by the labs can be sent to the Inbox from where they are taken by manufacturers for production. The setup process is described in Sites chapter of Dental System Control Panel section of the manual.

This section describes how to actually send orders to the Inbox.

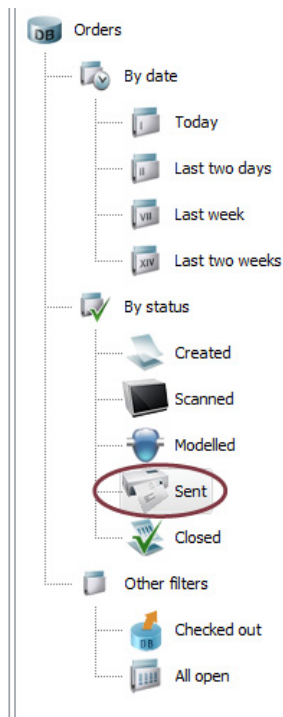
Run 3Shape DentalManager, select Orders tab and right-click the desired order from available with the scanned or modeled status to select *Send to Manufacturer* from the appeared menu. Only orders with scanned and modeled statuses can be sent to Inbox as shown on the image below.



1. Select preparation in the teeth overview.
2. Click the **Frame** button and select post and core.

Click Send and then the Close buttons once the transmission is completed. The icon of the sent order changes as shown on the image below.





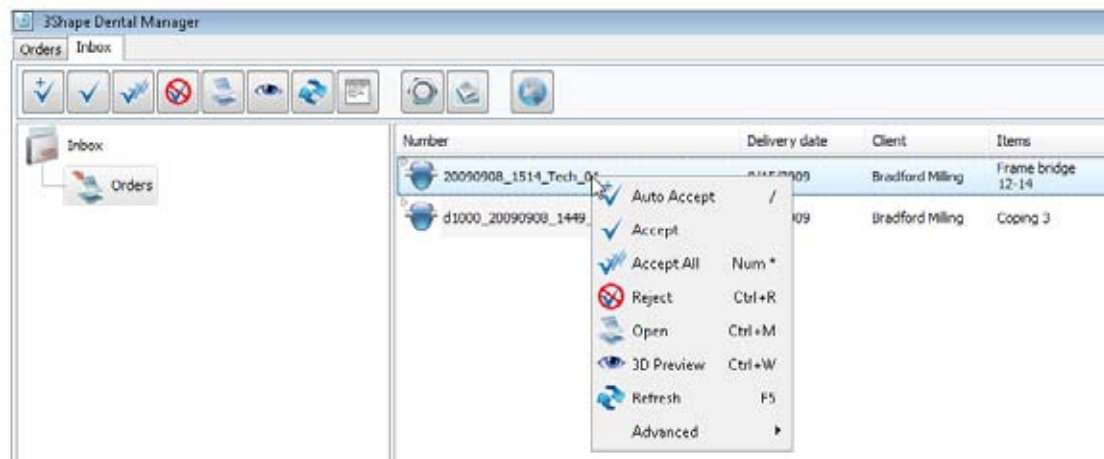
All orders sent to Inbox are shown in the **Sent** folder of the Orders tab.

2.6.2 Receiving and Handling Orders at the Manufacturing Center

The orders sent by the labs to the Inbox can be taken from there by manufacturers for production. The setup process is described in Manufacturing Inbox chapter of Dental System Control Panel section of the manual.

This section describes how to receive and handle orders from the Inbox.

Run 3Shape DentalManager, select **Inbox** tab and right-click the chosen order from available to select the desired action from the appeared menu, you can also use the toolbar buttons.



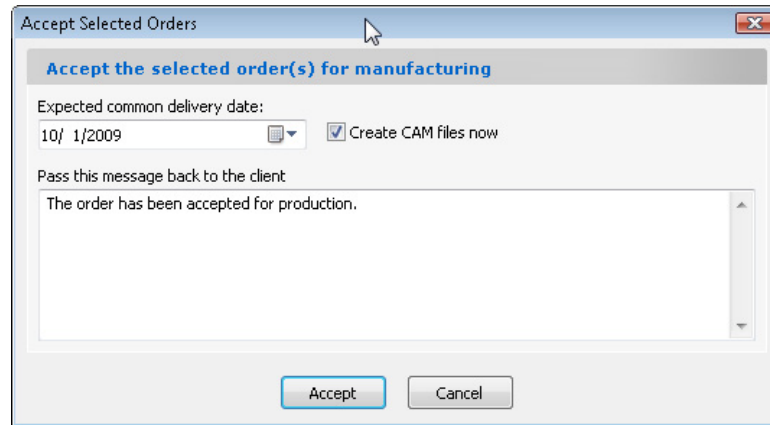
The system can be set up to accept orders automatically and create CAM files by default. If this action is desired, the **Inbox Auto Accept** check-box has to be selected in Dental System Control Panel (DSCP -> DentalManager -> Manufacturing Inbox -> Inbox Auto Accept).

The incoming orders can be inspected with *Open* or *3D Preview* options before being accepted.

The orders can also be accepted manually using the corresponding buttons **Accept** and **Accept All**.

Accept Selected Orders window appears when clicking the **Accept** button. There you can choose whether to create a CAM file at this time as well.

When **Create CAM files now** is checked, the CAM files are automatically created when the order is accepted.



Once the order is accepted, it is removed from the Inbox list and appears under the **Orders** tab with the status **Accepted**.

d1000_20090819_1452_Tech_01	9/8/2009 2:55:50 PM	8/19/2009	8/19/2009	Smile Dental	Waxup 3	Zirkon	Modelled	8.61 mm
d1000_20090819_1455_Tech_01	9/8/2009 2:58:22 PM	8/19/2009	8/19/2009	Sunny Clinic	Frame bridge 11-15	Zirkon	Scanned	-
d1000_20090804_1422	8/4/2009 2:23:18 PM	8/4/2009	8/4/2009	1574153356	Frame bridge 13-15	Zirkon	Scanned	-
d1000_20090908_1548_Tech_01_Black	9/8/2009 4:52:30 PM	9/15/2009	9/15/2009	Bradford Milling	Frame bridge 12-14	Zirkon	Accepted	7.66 mm
Ext14312_20090908_1820_Peterson	9/8/2009 6:27:53 PM	9/16/2009	9/17/2009	Sunny Clinic	Anatomy bridg...	Wax,Zirkon	Created	-/-
Ext14313_20090908_1846_Tech_01	9/8/2009 6:47:52 PM	9/8/2009	9/8/2009	Smile Dental	Coping 30, Crown 30	Wax,Zirkon	Modelled	7.51 mm
Ext14402_20090914_1549_Tech_01_Sorensen	9/14/2009 3:49:22 PM	9/14/2009	9/14/2009	Smile Dental	Telescope 2, 6, 11, 15	Zirkon	Scanned	-/-/-
Ext14405_20090915_1714_Tech_01	9/15/2009 5:14:55 PM	9/15/2009	9/15/2009	Johnson Milling	Abutment 9	Zirkon	Scanned	-
Ext14406_20090915_1756_Tech_01	9/15/2009 6:00:21 PM	9/15/2009	9/15/2009	Smile Dental	Coping 2	Zirkon	Scanned	-

The order is now received by the manufacturer, and depending on its state, it can be modeled or taken directly to production.

When the manufacturer receives an order, the create / delivery dates are set automatically depending on the Dental System Control Panel settings (*DSCP -> DentalManager -> ERP and processing time*). It is also possible to change/set the dates manually.

The orders should be closed when their processing is finished.

d1000_20090804_1422	8/4/2009 2:23:18 PM	8/4/2009	8/4/2009	1574153356	Frame bridge 13-15	Zirkon	Scanned	-
d1000_20090908_1548_Tech_01_Black	9/8/2009 4:52:30 PM	9/15/2009	9/15/2009	Bradford Milling	Frame bridge 12-14	Zirkon	Accepted	7.66 mm
Ext14312_20090908_1820_Peterson		9/16/2009	9/17/2009	Sunny Clinic	Anatomy bridg...	Wax,Zirkon	Created	-/-
Ext14313_20090908_1846_Tech_01		9/8/2009	9/8/2009	Smile Dental	Coping 30, Crown 30	Wax,Zirkon	Modelled	7.51 mm
Ext14402_20090914_1549_Tech_01		9/14/2009	9/14/2009	Smile Dental	Telescope 2, 6, 11, 15	Zirkon	Scanned	-/-/-
Ext14405_20090915_1714_Tech_01		9/15/2009	9/15/2009	Johnson Milling	Abutment 9	Zirkon	Scanned	-
Ext14406_20090915_1756_Tech_01		9/15/2009	9/15/2009	Smile Dental	Coping 2	Zirkon	Scanned	-

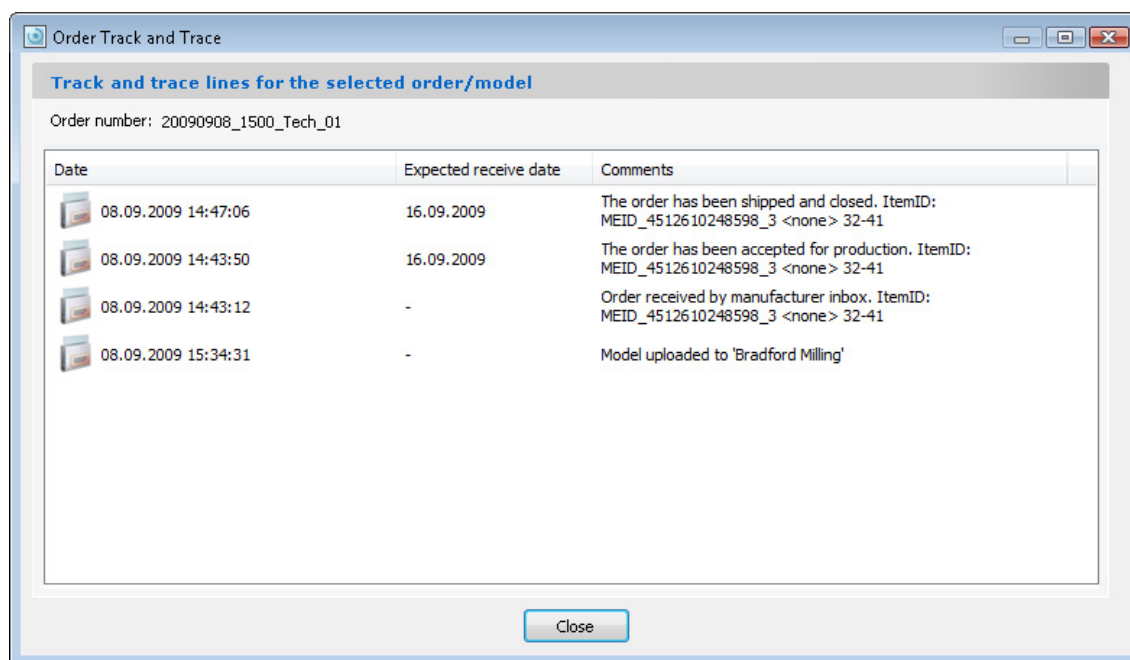
If for some reason the order is rejected , the customer gets a note in the list view.

2.6.3 Track and Trace Information between Lab and Manufacturing Center



It is possible to follow the status of the orders by utilizing the Track and Trace function. Right-click the order of interest in the Order list and select *Send -> Track and Trace* from the appeared menu.

Track and Trace for Selected Orders window opens up displaying the status of the selected order. An example of the window is shown below.



For the feature to work, it is necessary to have read and write access to the FTP directory, since the track and trace information is uploaded to and downloaded from the FTP server. Different FTP servers have different requirements for FTP directories e.g., some require "\" at the end of the directory, whereas others do not. In case of doubt, please consult the corresponding manufacturing site for proper settings.

2.6.4 Re-Sending Orders

With 3Shape Dental System software you can share the whole process among a few sites. For example, you have the possibility of creating and scanning orders at site 1, designing orders at site 2, and manufacturing them at site 3.

The possibility is given with the Inbox Add-on Module where the orders are shared between involved parties.

3 Scanning Models - ScanItRestoration


The ScanItRestoration module is designed to scan various restorations while saving them in files at the predefined location setup in Dental System Control Panel. The scanning is very intuitive although some technical knowledge is required to get optimal results from ScanItRestoration.

Most objects to be scanned will be fixed to a simple interface plate (see chapter *Unpacking and Installation*) before being inserted into the scanner. The interface plate facilitates connection between the scan object and the scanner. The object to be scanned is fixed to the top of the interface plate using clay. Once the object is fastened into place it can be inserted into the scanner.

3.1 User Interface

To start working with ScanItRestoration you have to first define your order in the Order form (see chapter *Creating Orders* for more details). It now appears in the DentalManager list of orders with the status **Created**. If you want to start the scanning process immediately, click on the **Scan** button - this will bring you directly to ScanItRestoration.

Order Form

Lab information	Order settings	Scan settings
Operator: Tech 01	Order number: 20091022_1522_Tech_01	Object type: Model
Customer information		Antagonist: None
Customer: -none-	Importance: Normal	Face Scan: None
Contact person:	Design Module: DentalDesigner 2009	Neighborhood scan: <input checked="" type="checkbox"/>
Create date: 10/22/2009		Double preparation: <input type="checkbox"/>
Shipping date: 10/22/2009		Pre-preparation scan: <input type="checkbox"/>
Patient information		
Last name:		
First name:		
Comments		
		
Index: 4 Additional:		
Anatomy Frame Telescope Abutment Bridge Type: Silhouette		
Scan OK Cancel		

Otherwise, select the created order from the DentalManager order list and start ScanItRestoration by clicking **Next** or **Scan** button in the Main toolbar (see image below) or right-clicking on the order and selecting **Next** or **Scan** from the right-click menu.


3Shape Dental Manager

Orders: **Inbox**

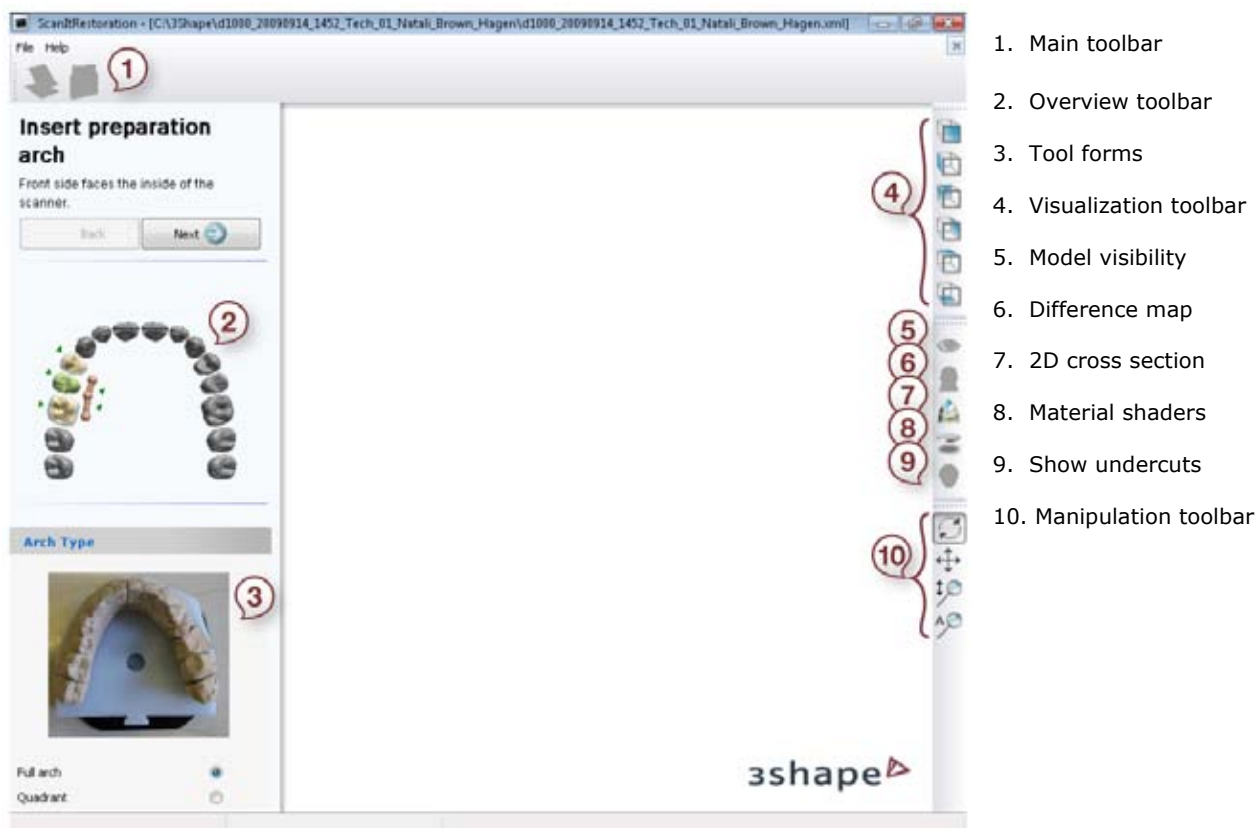
By date
Today
Last two days

Number	Creation date	Shipping date	Delivery date	Client
20090908_1427_Tech_01	9/8/2009 2:47:23 PM	9/21/2009	9/8/2009	Bolton Lab
20090908_1449_Tech_01_John_Peterson	9/8/2009 2:52:38 PM	9/16/2009	9/16/2009	Smile Dental
20090908_1500_Tech_01	9/8/2009 3:13:00 PM	9/16/2009	9/16/2009	Smile Dental

On starting ScanItRestoration the order in the list changes its icon to locked for scanning:

 d1000_20090706_1359_Tech_... 7/6/200... 7/6/2009 - Crown 11... Zirkon

ScanItRestoration window opens up asking you to insert your preparation.



After scanning has been completed successfully, the orders change their status from **Created** to **Scanned** as illustrated below in the DentalManager order list.

The screenshot shows the DentalManager software window. The 'Orders' tab is selected, and a list of orders is displayed. One order, '20131_20090818_1688_Tech_01', is highlighted with a red circle, indicating its status has changed to 'Scanned'.

Number	Creation date	Shipping date	Delivery date	Client	Item	Material	Status	Height
20090908_1427_Tech_01	9/3/2009 2:47:23 PM	9/21/2009	9/8/2009	Solton Lab	Coping 30, Crown 30	Wax_Zirkon	Modelled	6.48 mm
20090908_1449_Tech_01_30mm_extensions	9/3/2009 3:13:18 PM	9/26/2009	9/26/2009	Smile Dental	Coping 30, Crown 30	Wax_Zirkon	Accepted	~
20090908_1500_Tech_01	9/3/2009 3:13:30 PM	9/16/2009	9/16/2009	Smile Dental	Frame bridge 23-23	Zirkon	Shipped	
20131_20090818_1688_Tech_01	8/18/2009 4:29:41 PM	8/18/2009	8/18/2009	ABC Lab	Frame bridge 3-12	Zirkon	Scanned	
20131_20090818_1065_Tech_01	8/19/2009 2:54:30 PM	8/19/2009	8/19/2009	Summ Clinic	Crown 30	Wax_Zirkon	Modelled	6.29 mm
20131_20090818_1417_Tech_01	9/3/2009 2:54:43 PM	9/19/2009	9/19/2009	Summ Clinic	Frame bridge 2-4	Wax_Zirkon	Modelled	9.44 mm

3.2 Scanning

In this section you will find a detailed description of how to scan different cases step by step.

3.2.1 Single Coping

One of the simplest scanning operations that can be performed is scanning a single die.

Before scanning a die define your order in the Order form and click **Scan**.



When the program opens, insert the requested tooth into the scanner.

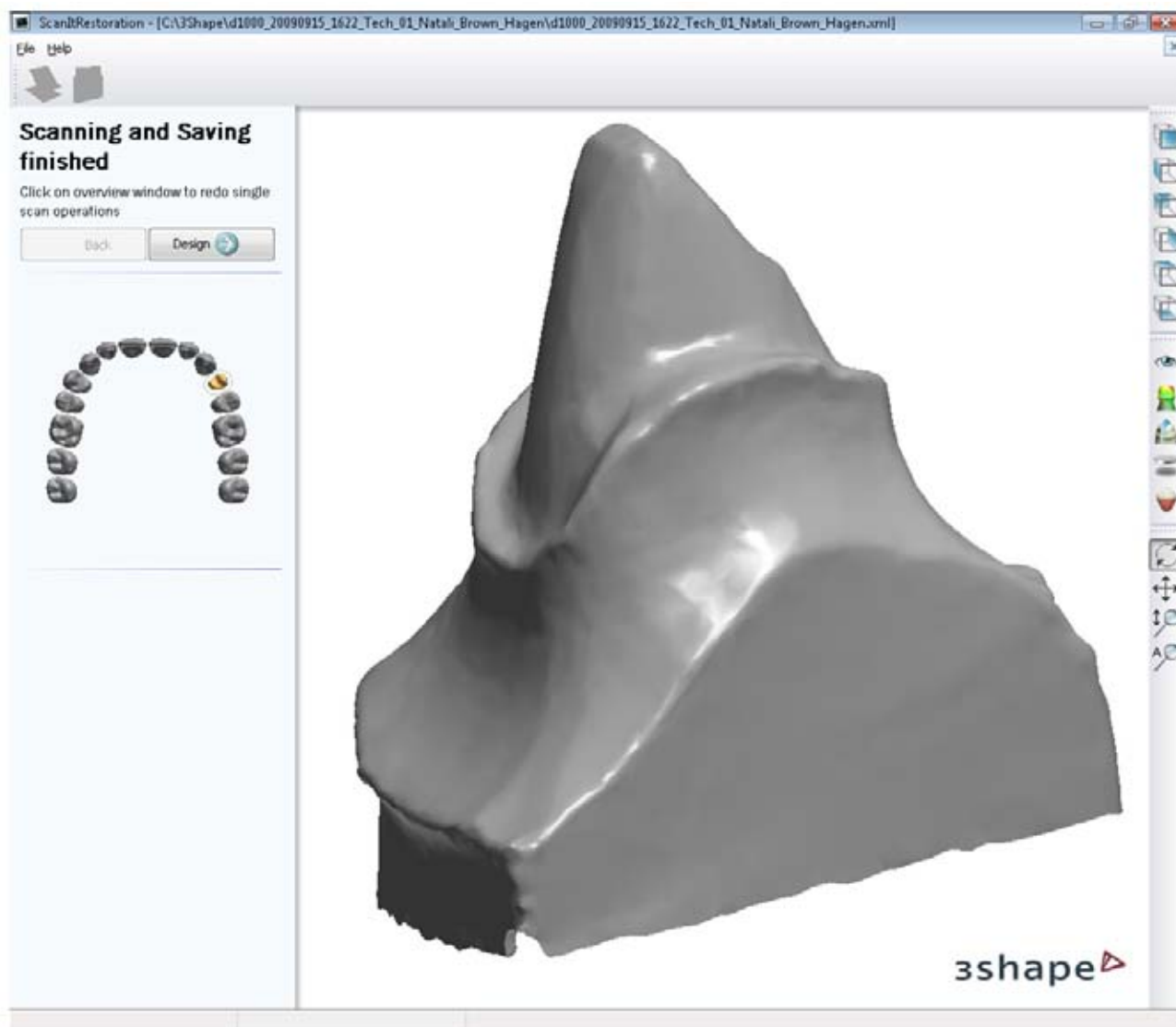


Hint! Place the die at the center of the plate.

The scanning process starts on clicking the **Next** button.



It may take a minute for the post-processing to finish. Your model is now scanned and saved. If you would like to start the modeling process in DentalDesigner, click the **Design** button. It is not necessary to close down ScanItRestoration after each scanning process.



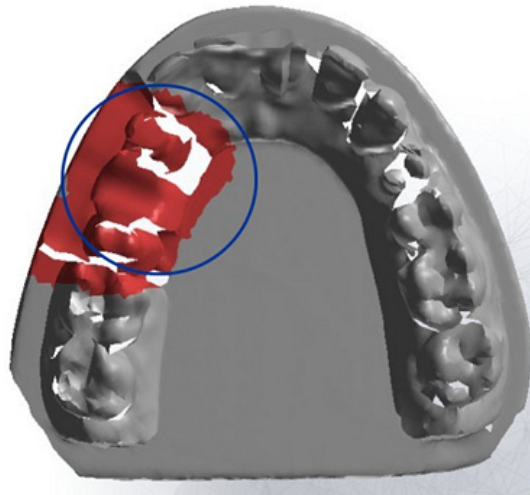
3.2.2 Bridge Framework

Using DentalManager create a new order and make necessary settings for a framework bridge in the Order Form.

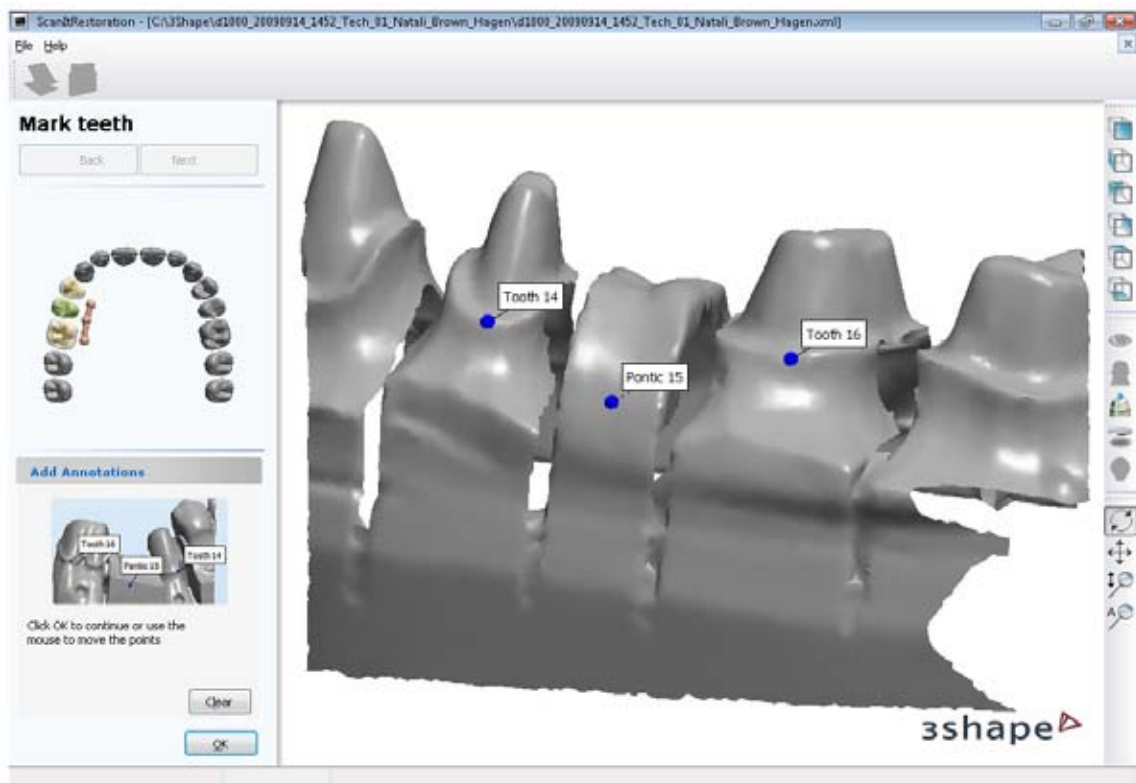
Having completed defining a new order, click **Scan** button to proceed to the scanning step. This opens ScanItRestoration window asking you to insert the arch as a sectioned cast model or an impression. The cast/impression should be fixed with its flat bottom side to the black scanning interface plate. It is very important that the object is secured and cannot move during scanning. Both should then be placed into the scanner (the plate will click into the correct position inside the scanner with the help of the fixing spheres and markers on the plate). Close the scanner door and click the **Next** button to start the overview scan.



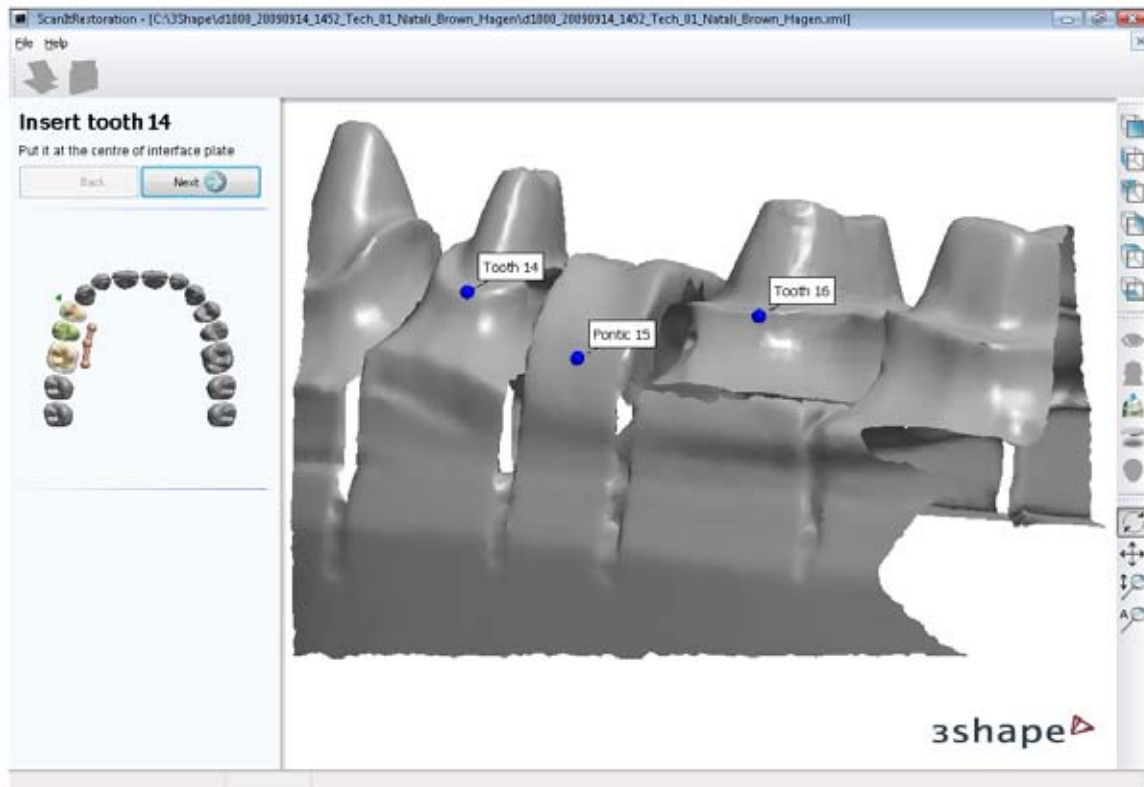
The initial scan is a rough general scan of the arch/cast. You can now use the selection tools (see image to the left) to select the detailed scan area.



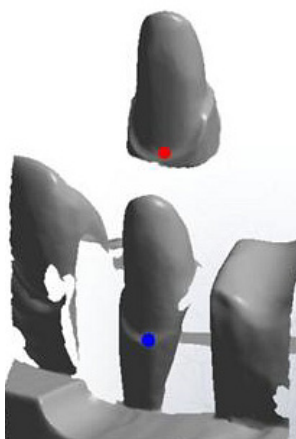
The selected area is highlighted in red. Click **Next** to start the detailed scanning of the selected area. Once the detailed scan has finished a more clearly defined 3D model is displayed on the screen. At this stage you are offered to mark the dies for individual scanning. Place the points with the left mouse button on the margin line on the front of the teeth as shown on the image below:



Next, you are required to scan each tooth separately by inserting them into the scanner as prompted by the software dialog.



Once the first tooth is inserted into the scanner, click the **Next** button to perform scanning.



After the scanning of an individual die has occurred a warning message may appear to indicate that the software needs some manual assistance to merge the die to the impression with the higher accuracy. Place the point on a newly scanned die with the left mouse button and then the second point on the corresponding location on a scan (the points should be placed in approximately the same area of the die).

Once scanning and saving is finished you can go straight to the modeling procedure by clicking the **Design** button or you can opt to trim preparation or pre-preparation scan first. When required, you can redo single scan operations, initiating them with a click on overview window.

3.2.3 Full Anatomical Crown

A full anatomical crown scanning is identical to the bridge framework scan, please see section *Bridge Framework* for details.

3.2.4 Full Anatomical Bridge

A full anatomical bridge scanning is identical to the bridge framework scan, please see section *Bridge Framework* for details.

3.2.5 Anatomical Copings and Framework

The anatomical copings and framework scanning is identical to the bridge framework scan, please see section *Bridge Framework* for details.

3.2.6 Inlay/Inlay Bridge

An inlay/inlay bridge scanning is identical to the framework bridge scan, so please see section *Bridge Framework* for details.

3.2.7 Onlay/Veneers

The onlay/veneers scanning is identical to the bridge framework scan, please see section *Bridge Framework* for details.

3.2.8 Over-pressed Crowns and Bridges

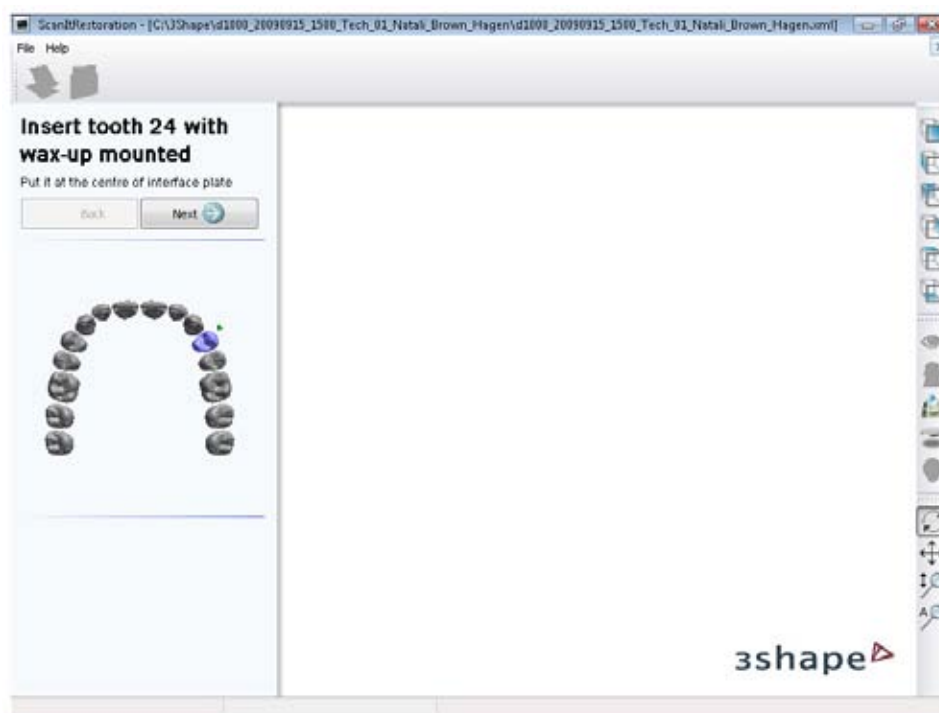
The over-pressed crowns and bridges scanning is identical to the bridge framework scan, so please see section *Bridge Framework* for details.

3.2.9 Single Wax-up

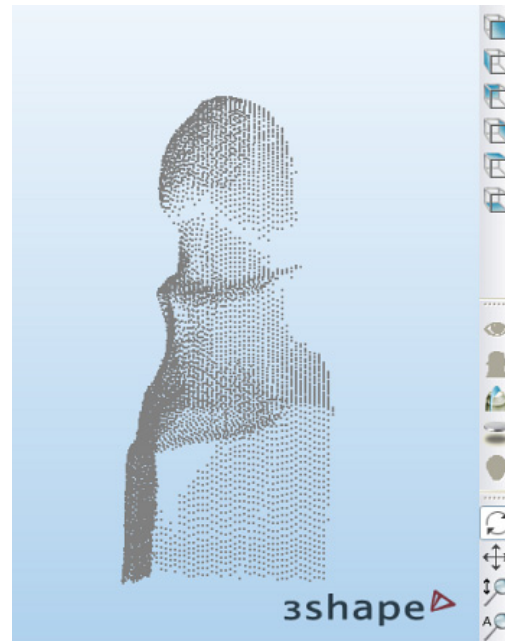
Before scanning a wax-up and a die define your order in the Order form and click **Scan**.
When the program opens, insert the requested tooth together with its wax-up into the scanner.



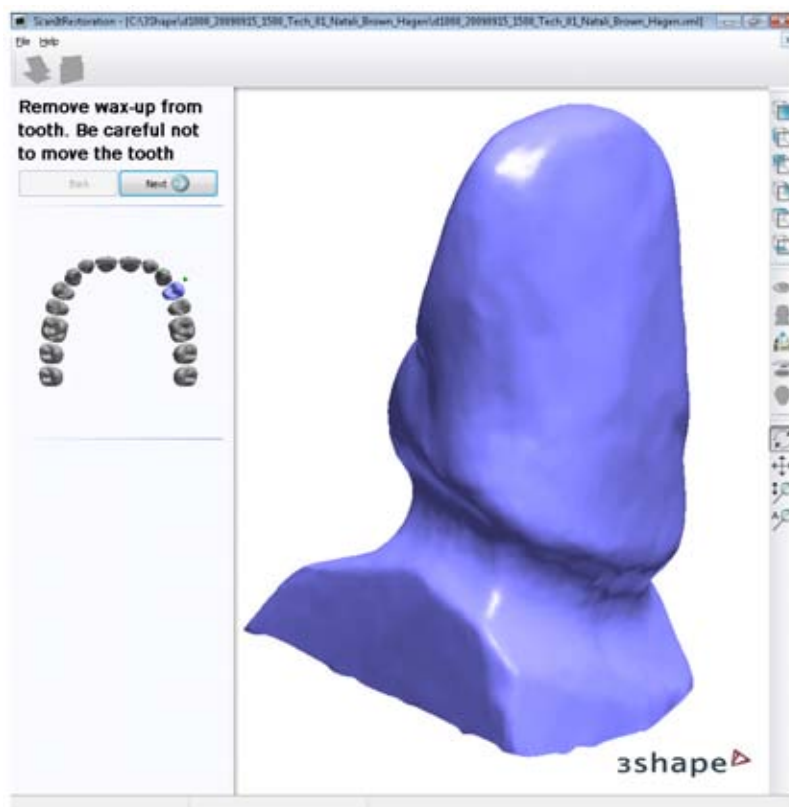
Hint! Place the die with the wax-up at the center of the plate.



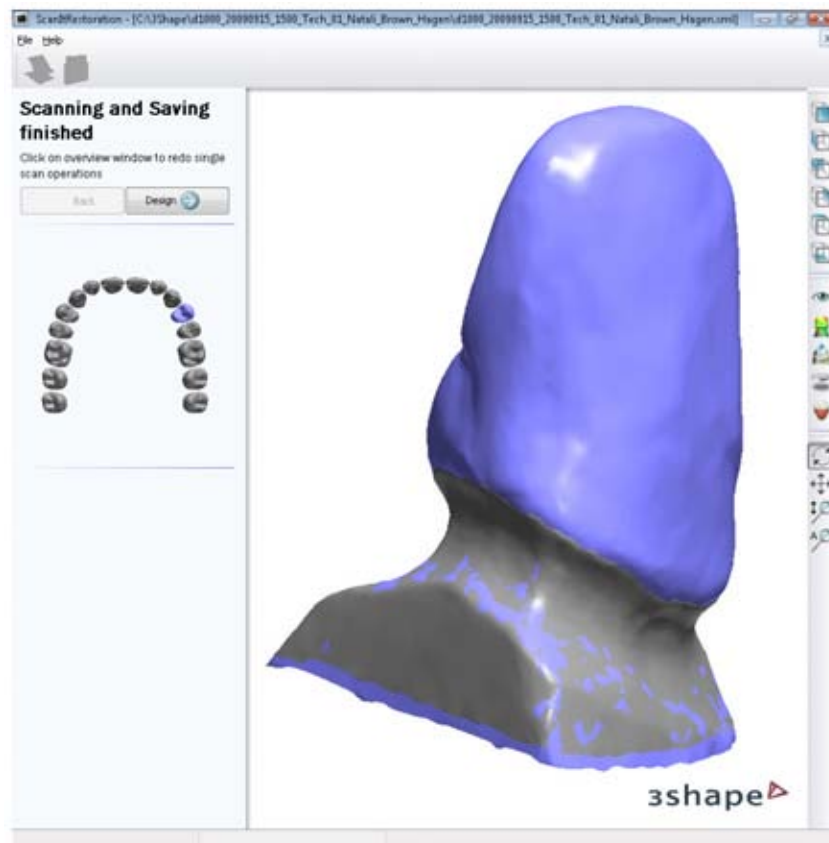
The scanning process starts after you have clicked **Next**.



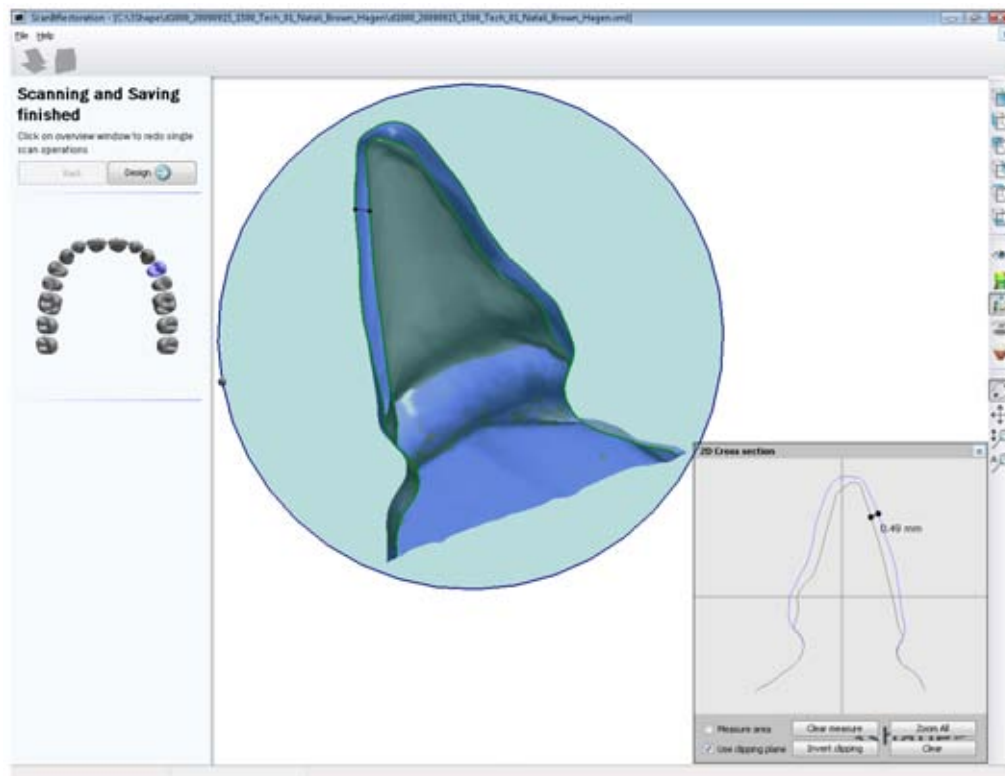
Carefully remove the wax-up from the tooth and click **Next** to separately scan the die.



After the die has been scanned the program automatically aligns the wax-up and the die, scans and saves the result. If you would like to start the modeling process in DentalDesigner, click the **Design** button. It is not necessary to close down ScanItRestoration after each scanning process.



The image below illustrates the cross section of a model with the clipping plane being used.

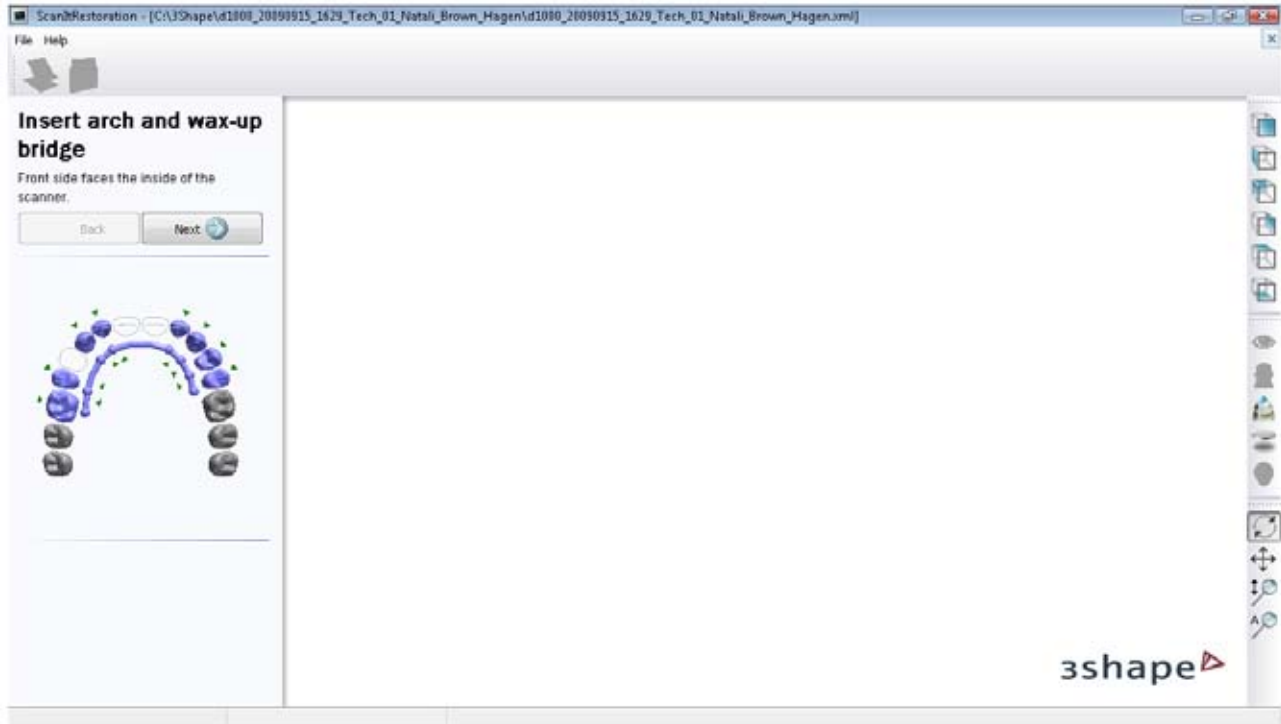


3.2.10 Wax-up Bridge

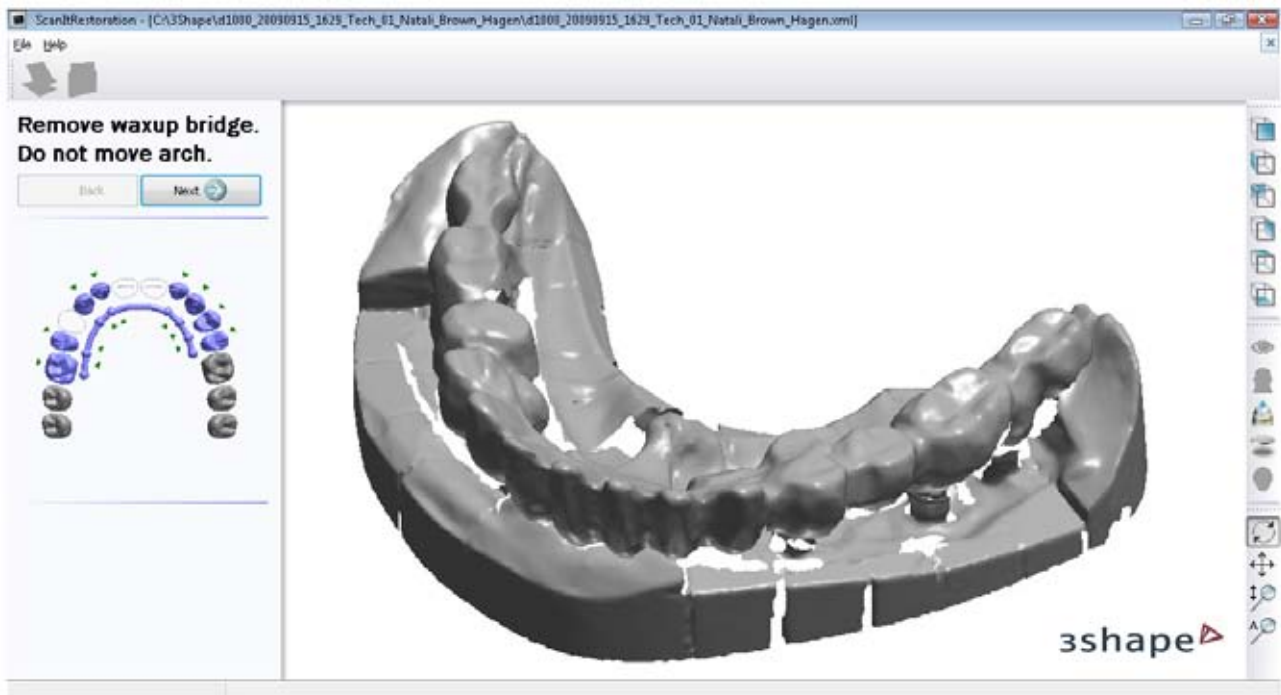
Using DentalManager create a new order and make necessary settings for a wax-up bridge in the Order Form.

Having completed defining a new order, click **Scan** button to proceed to the scanning step. This opens ScanItRestoration window asking you to insert arch and wax-up bridge. Previously created orders can be sent to scanning with the **Next** or **Scan** options available from the right-click menu on one of the created orders listed within DentalManager.

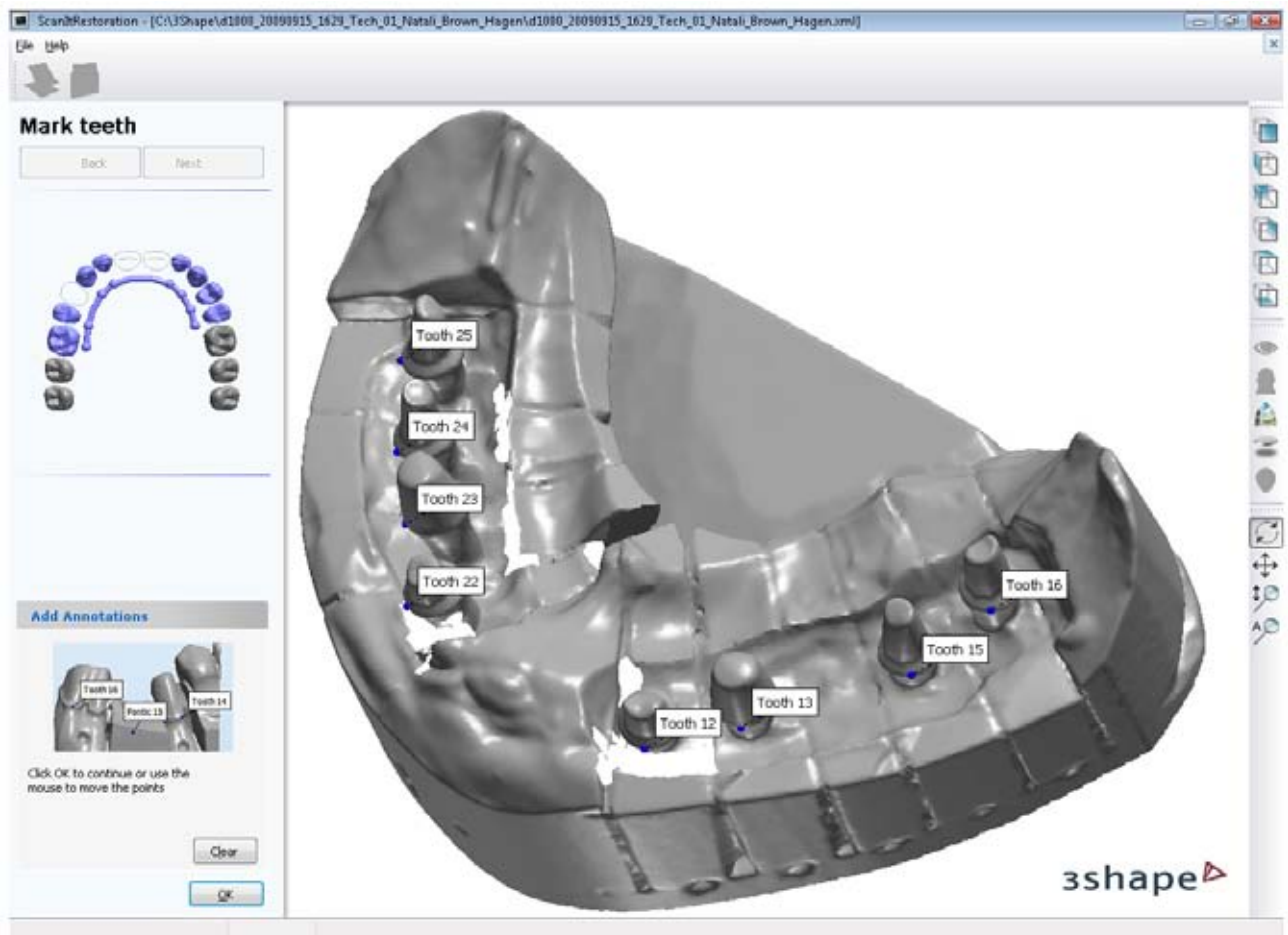
Click **Next** button to scan arch and wax-up bridge together.



Once scanning is done, remove wax-up bridge to scan only arch. Click **Next** button to continue.



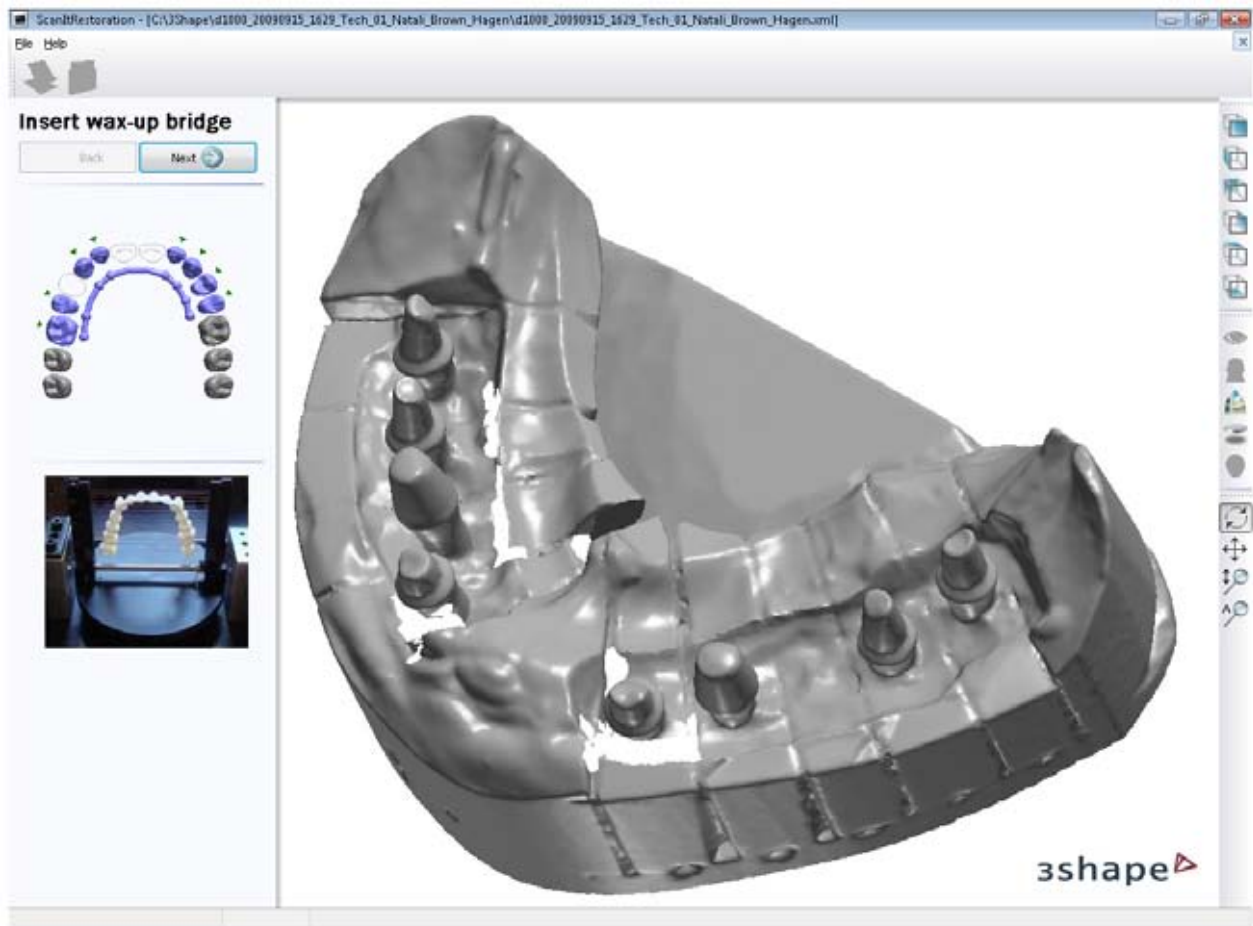
Mark the teeth accordingly at the next step and click **OK** to continue:



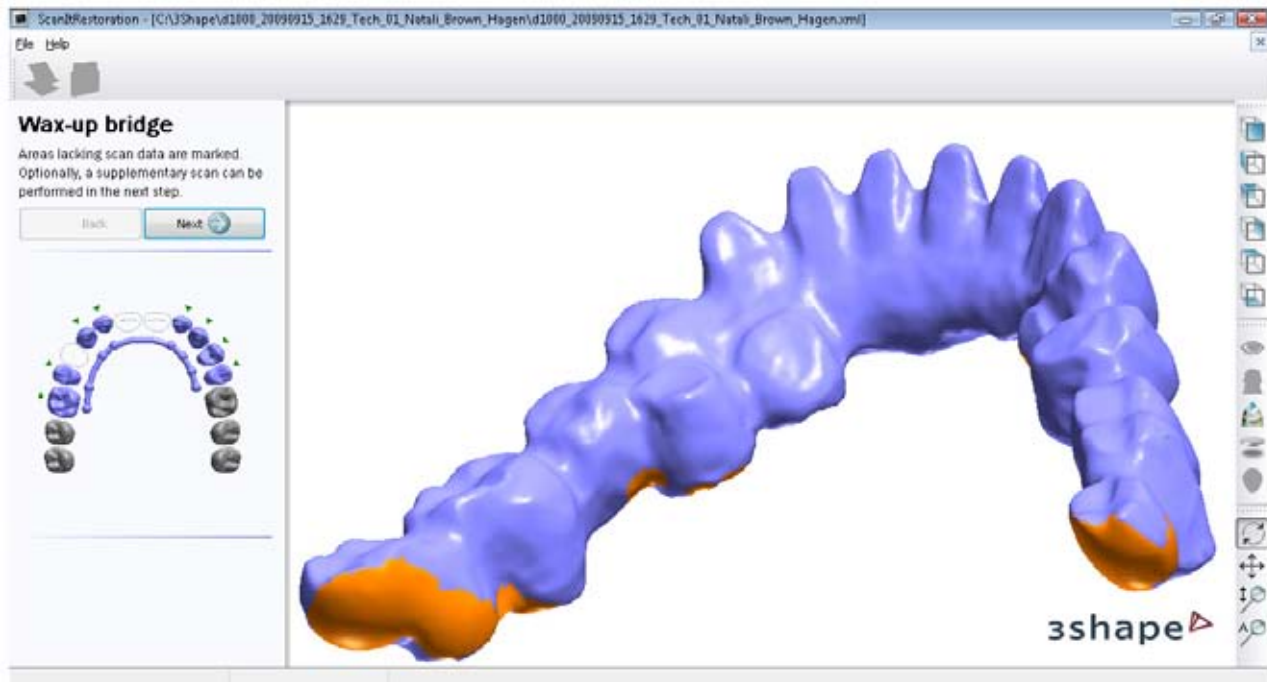
Remove arch and insert a wax-up bridge.

You should **mount the wax-up bridge on the specially designed fixture** (view this fixture with a bridge on the image below). Since the wax-up bridge often needs to be painted before scanning, it is important to ensure that the strings of the fixture are not polluted by the paint. The wax-up bridge should be mounted so that the important part (e.g. the front side of the teeth) is well visible for the cameras and laser in order to obtain optimal scanning coverage.

Typically, invisible surfaces face downwards. **The wax-up bridge should not be placed too high on the fixture** (preferably not higher than the second highest string) and it should be secured so that it will not move during scanning. When the fixture is inserted into the scanner, the strings on the fixture should be approximately parallel to the front wall of the scanner.

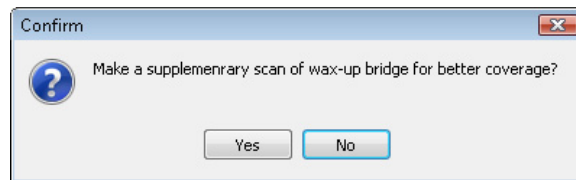


Then click **Next** button to scan wax-up bridge:

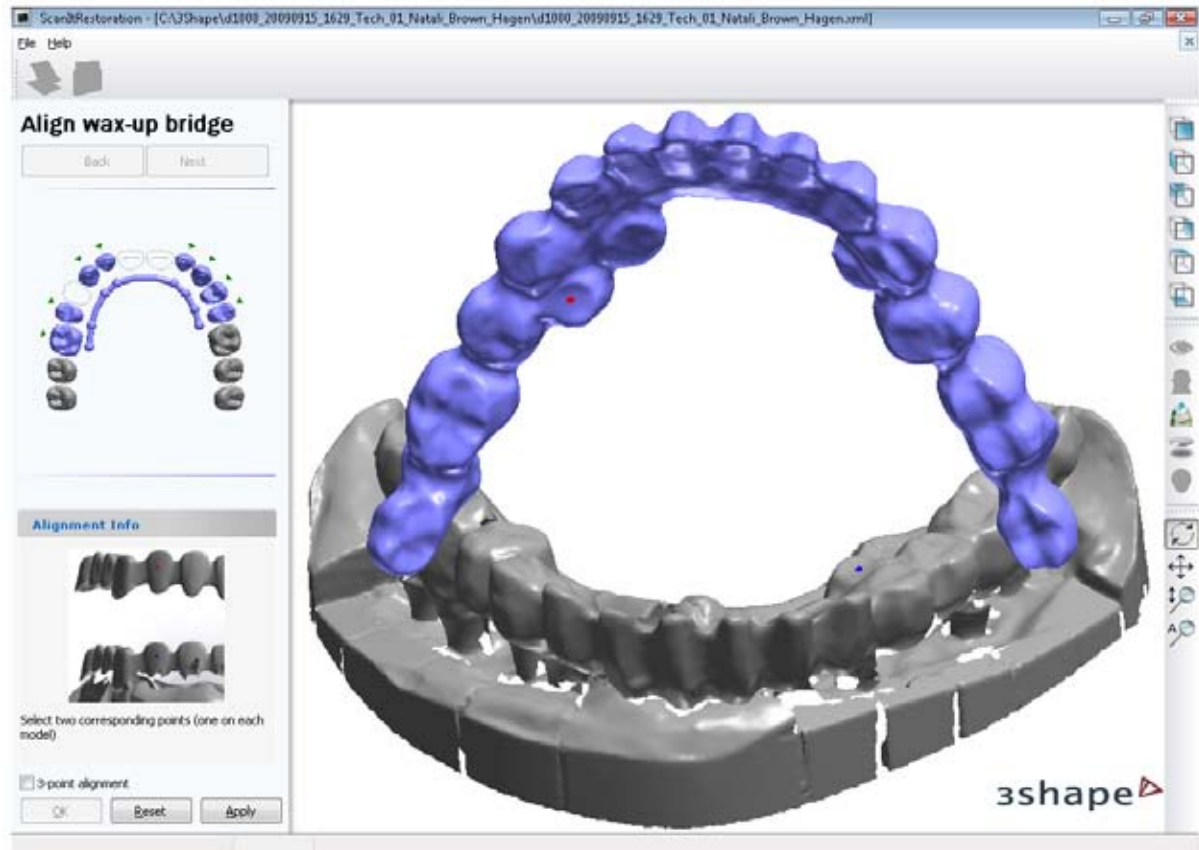


A scan of wax-up bridge has been received. In a case when scan data is lacking for some areas, they are marked in orange color. A supplementary scan can be performed to reduce blind spots.

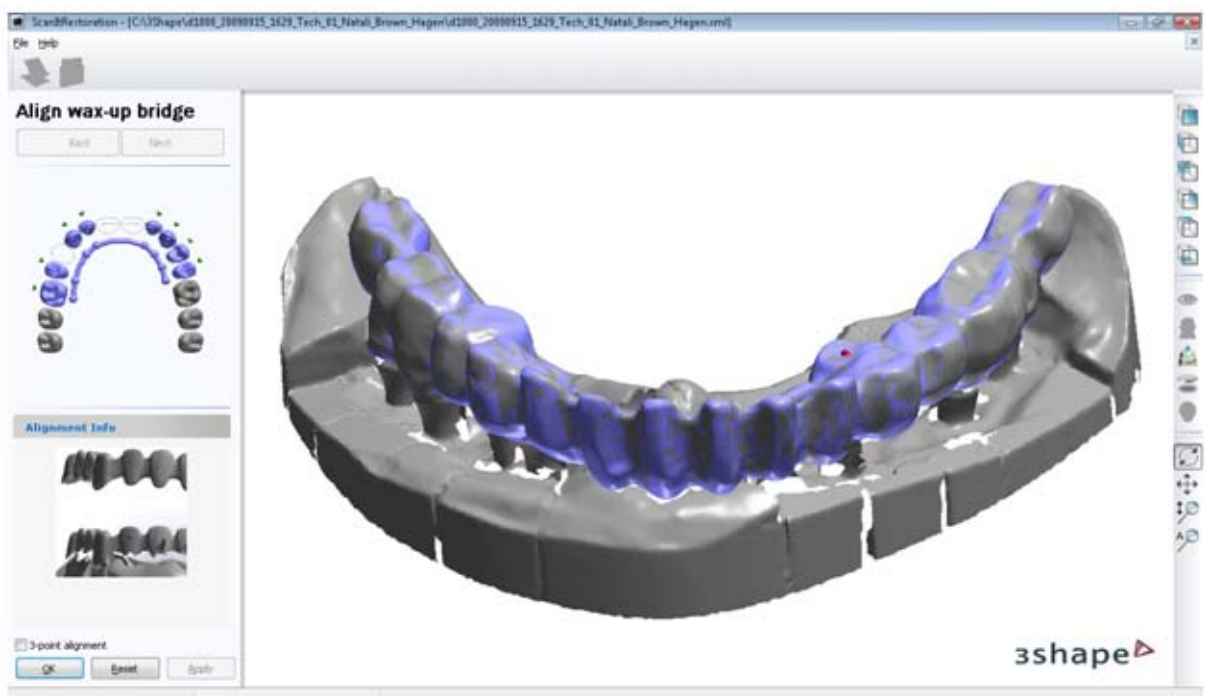
Click **Next** to continue and make a selection whether you want to perform supplementary scan before going to the next step.



Mark alignment points on arch and wax-up bridge using either one or 3-point method:



Click **Apply** button to execute alignment as shown on the image below:

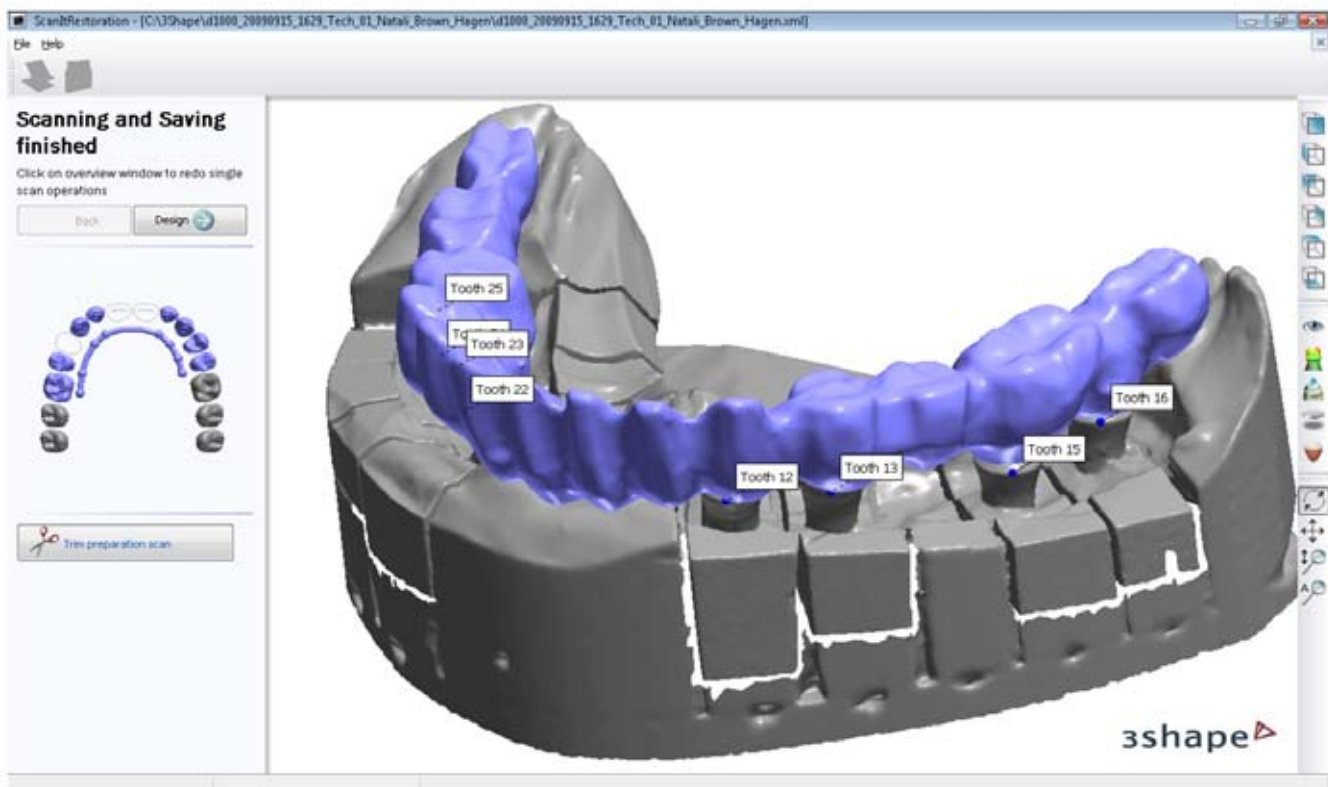


Click **OK** to go to the teeth scanning step.

At teeth scanning step, the teeth are placed in scanner and scanned one by one in a defined order:



At the last step the scanning is complete and saved. You can either trim the preparation scan or go straight to the **Design** step.



3.2.11 Telescope

A telescope scanning is identical to the bridge framework scan, please see section *Bridge Framework* for details.

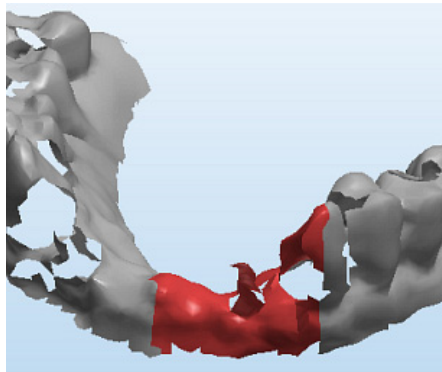
3.2.12 Customized Abutments

Before scanning abutments define your order in the Order form and click **Scan**.

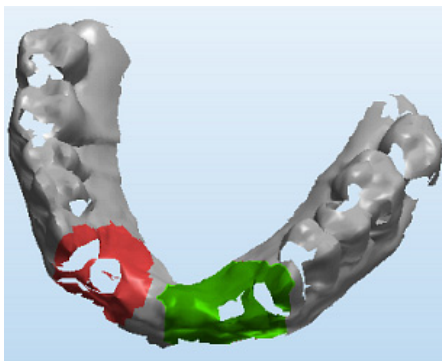
Once your order has been defined, ScanItRestoration will start and ask you to insert the arch with scan abutments. Preferably, no gingival mask should be mounted now in order to enhance visibility of the scan abutments.

Once **Next** is selected, a rough selection scan will begin.

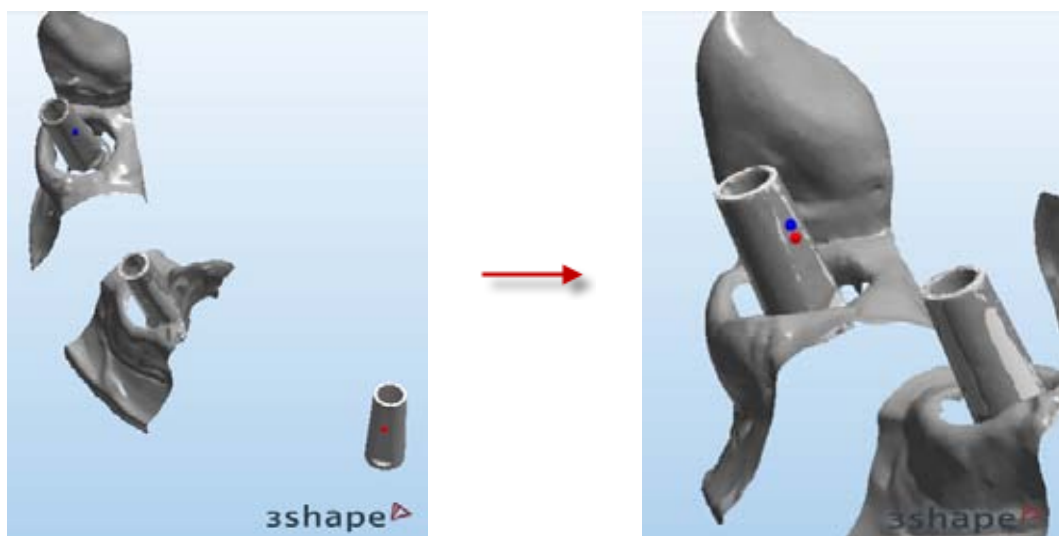
On completion of the quick scan the area around abutments should be selected one by one for detailed scanning.



When one abutment has been selected, click **Continue**. The selected area will turn green and you will be asked to select the next abutment (see image below). If the abutments are located close to each other, you can make one big selection instead of separate ones. Detailed scanning will start when selection of all abutments is finished. In the following step the detailed scan is used to align the CAD model of each abutment to the corresponding scan.

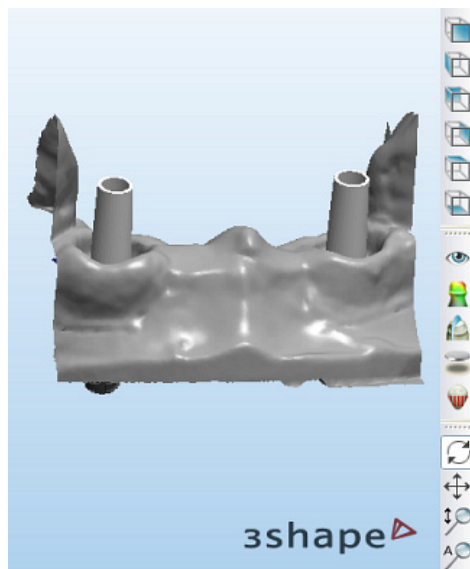


When detailed scanning and post-processing of abutments are finished, you will be asked to align the abutments one by one. To align an abutment, select two corresponding points: one on the CAD model and the other on the scanned abutment and click **Apply** button. The result of alignment will be displayed on the screen. The images below illustrate the alignment process. Click **OK** if the result is satisfying and align the next abutment the same way.



Once abutment alignment is finished, you will be prompted by the confirmation window asking if you want to scan the gingival mask. When you click on **Yes** (recommended), the program will ask you to remove the abutments from the arch and insert the gingival mask. Similar to bridge scanning, you should select the area for detailed scanning after a rough scan.

At the final step you can trim your preparation scan (**Trim preparation scan** button) or realign abutment scan. For realignment, click on the desired tooth in the Overview toolbar and select the **Align for abutment #** button that appears on the screen.



Click the **Design** button to start the modeling process in DentalDesigner. It is not necessary to close down ScanItRestoration after each scanning process.

3.2.13 Implant Bars and Bridges

The implant bars and bridges scanning is identical to the customized abutments scan, please see section *Customized abutments* for details.

3.2.14 Antagonist Bite

A bite scan can be used for visualization purposes. A scan of the bite mounted on the cast can be used in DentalDesigner to assist with the sizing of restorations. Once an order has been defined in the order form the scan process can then begin.

Once a bite has been created there is usually the need to cut off excess material for the scanning to run faster. The images below show the bite mounted on the cast. A blade should be used on the sides of the bite model to clean off the excessive bite material pushed over the sides of the cast. Care should be taken not to cut through the area where the teeth have made an impression on the bite.



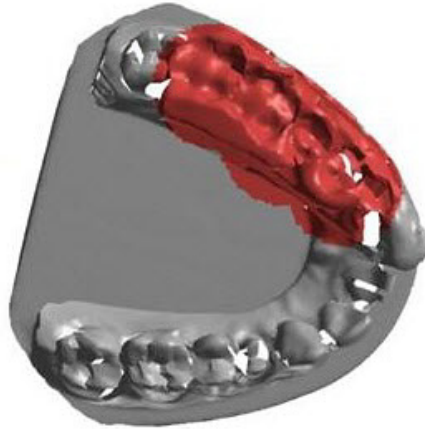
Untrimmed bite model



Trimmed bite model

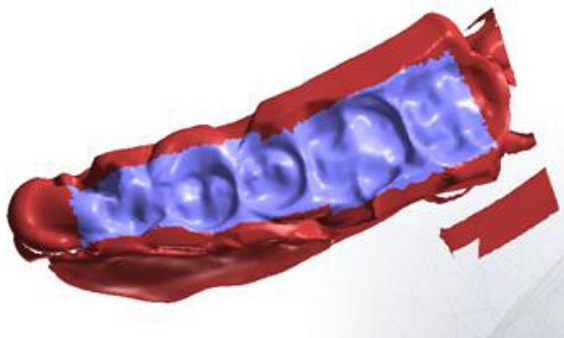
Before scanning, define your order in the Order form and click **Scan**.

When the program loads, insert the cast with the bite mounted. When you click the **Next** button a rough preview scan begins. On completion of this quick preview scan the area of interest should be selected for detailed scanning.



Remove the bite once detail scanning is complete. The cast should remain in the scanner. Once the bite has been removed from the cast the same selection can be used for the detail scanning of the cast.

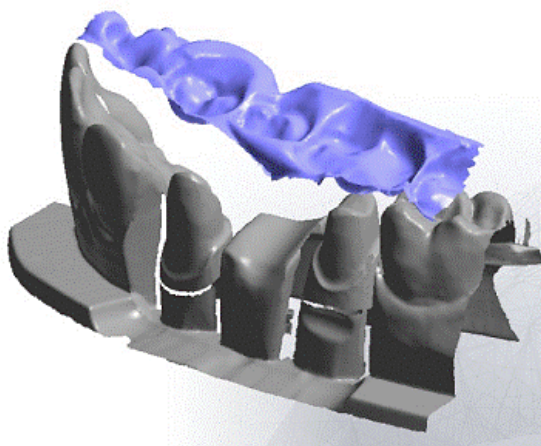
Now that the bite and the model have been scanned the scans are displayed together on the screen. The bite scan might need trimming.



Use the selection tools to mark the unnecessary areas of the bite scan. Basically the edges should be removed leaving only the imprint of the upper teeth. Click **OK** after you have finished.

The rest of the antagonist bite scanning is similar to the bridge framework scan, please see section *Bridge Framework* for details.

The image below illustrates the final stage of the antagonist bite scanning:



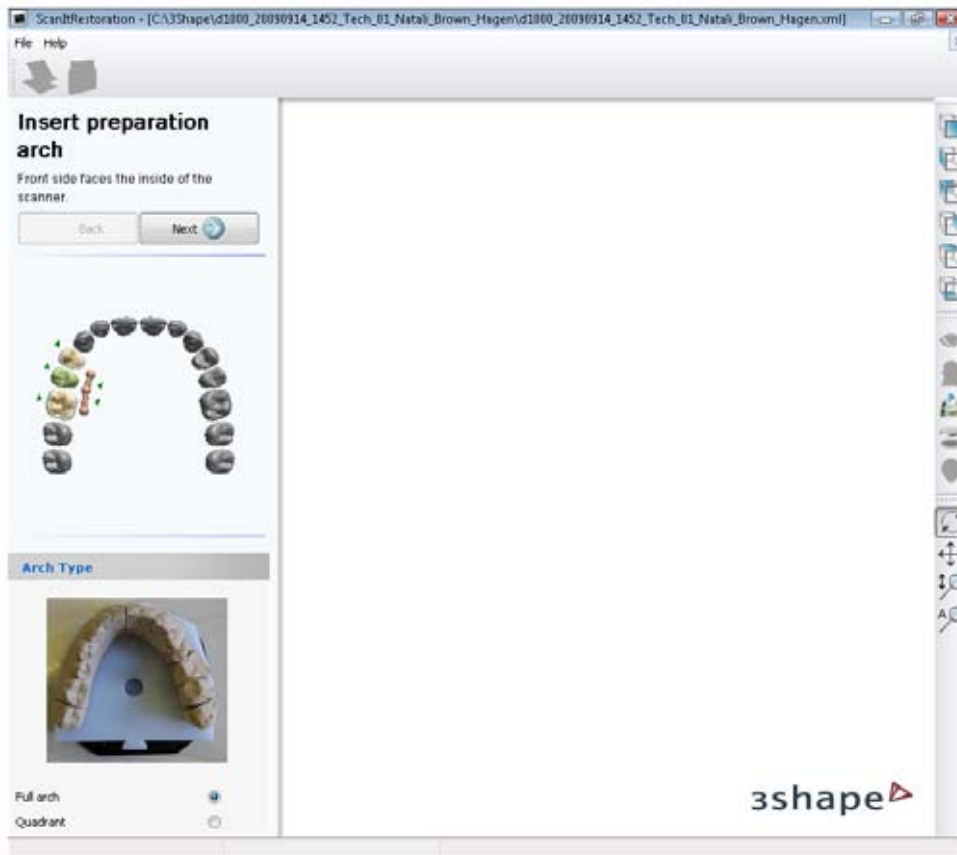
3.2.15 Antagonist Model

In this example you will see how to scan a bridge model with antagonist.

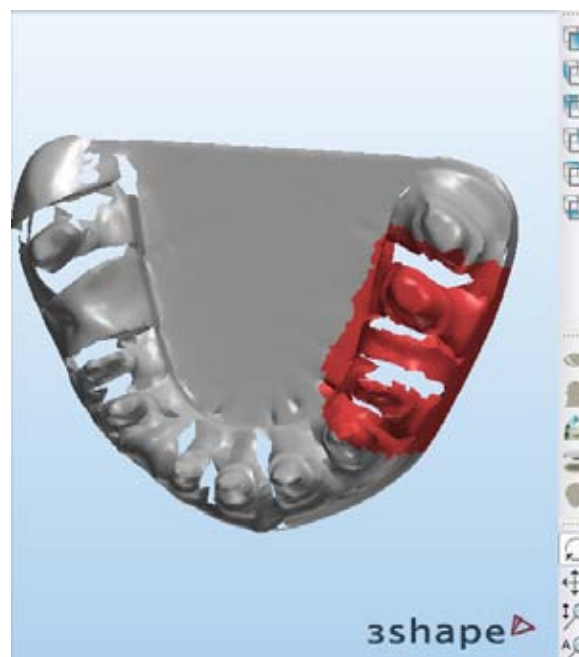
Using DentalManager, create a new order and make necessary settings for a bridge with antagonist in the Order Form. Having completed defining a new order, click **Scan** button to proceed to the scanning step. This opens ScanItRestoration window asking you to insert preparation arch.

Previously created orders can be sent to scanning with the *Next* or *Scan* options available from the right-click menu on one of the created orders listed within DentalManager.

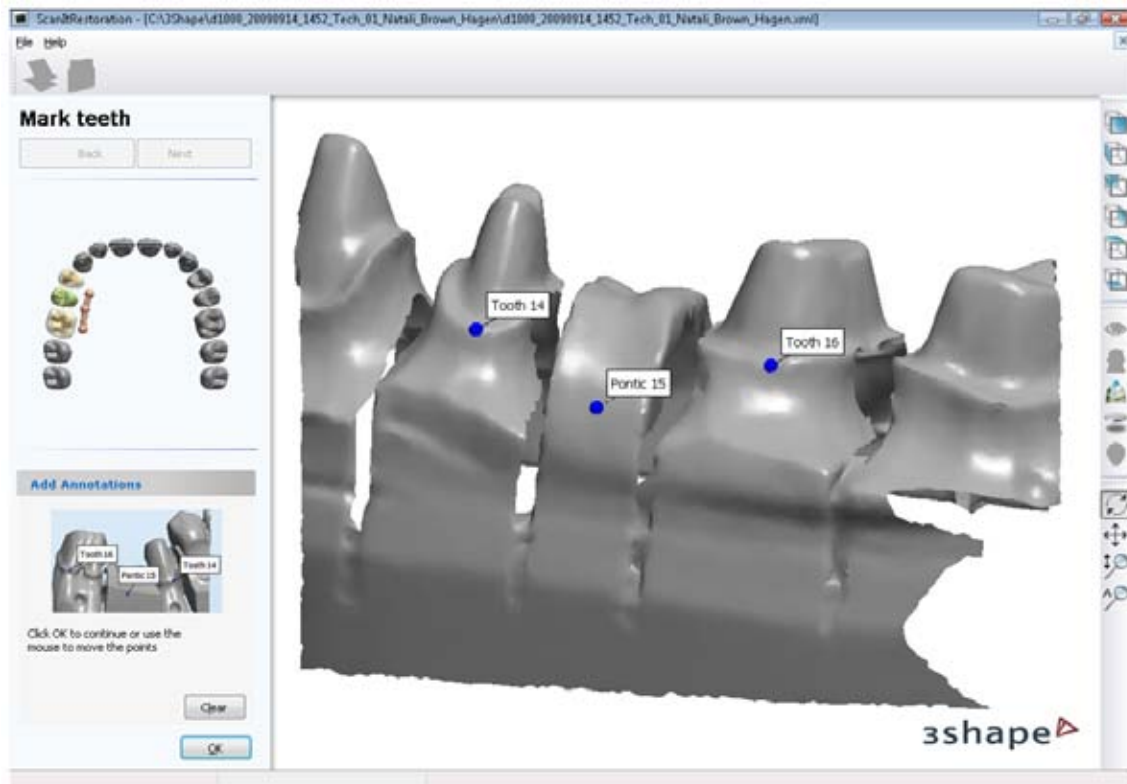
Click **Next** button to scan preparation arch.



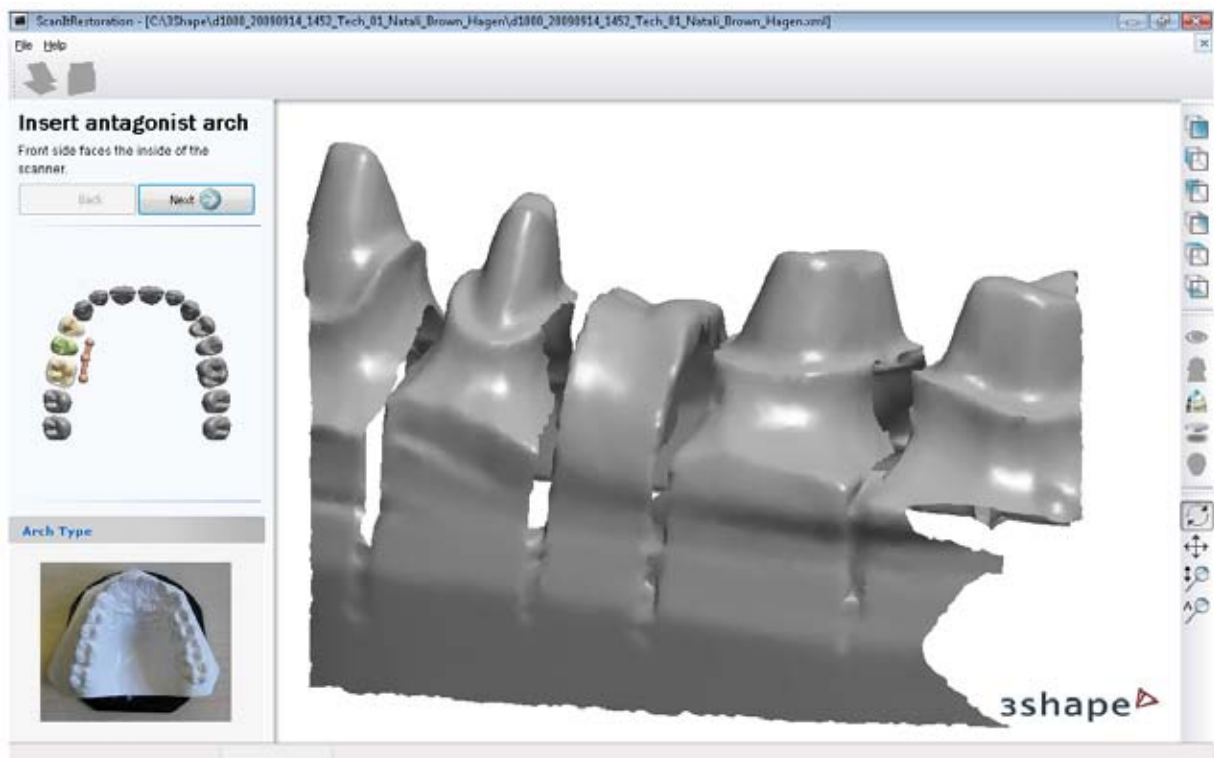
Once initial scanning is done, select the area on the scanned arch for a detailed scan with the available tools and click **Continue** button.



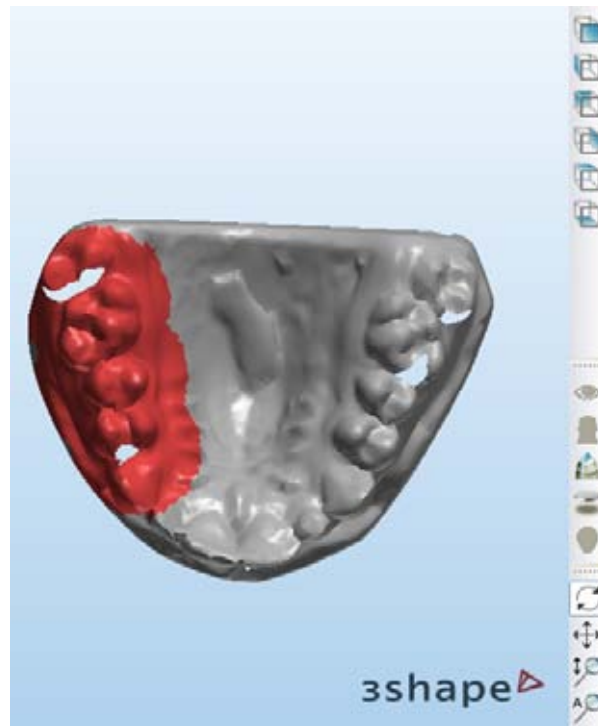
At the next step you mark teeth in the detailed scan accordingly, then click **OK** button to continue:



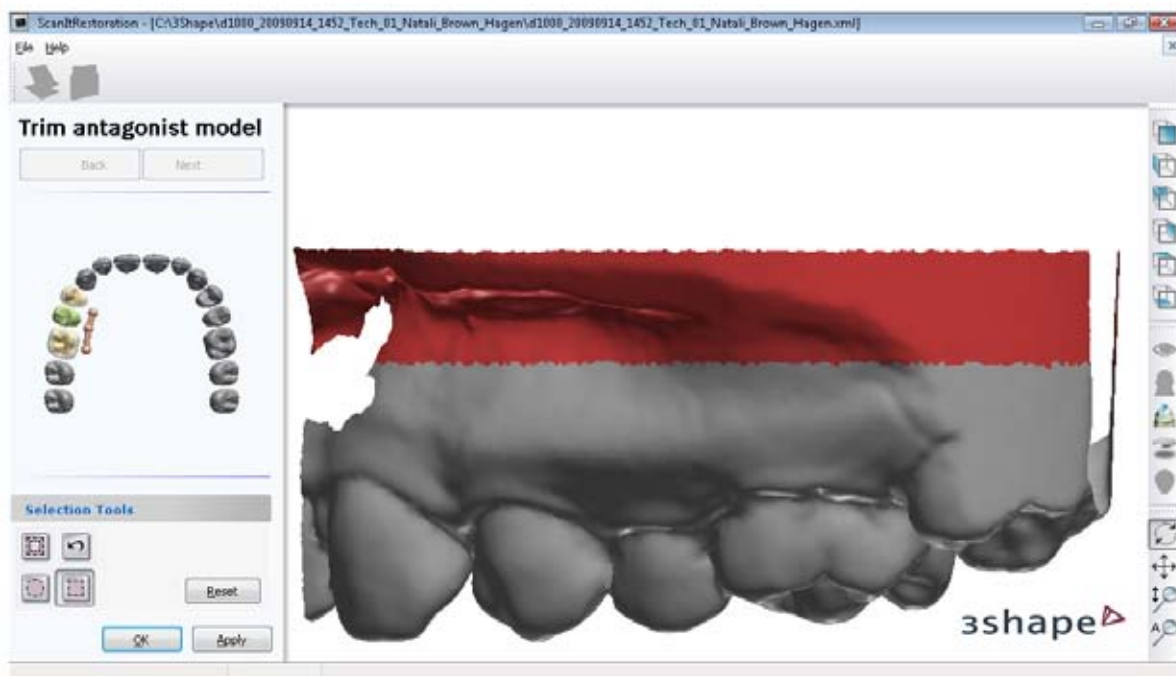
The next step requires you to replace preparation arch with antagonist arch in the scanner.
Click **Next** to perform scanning of antagonist arch.



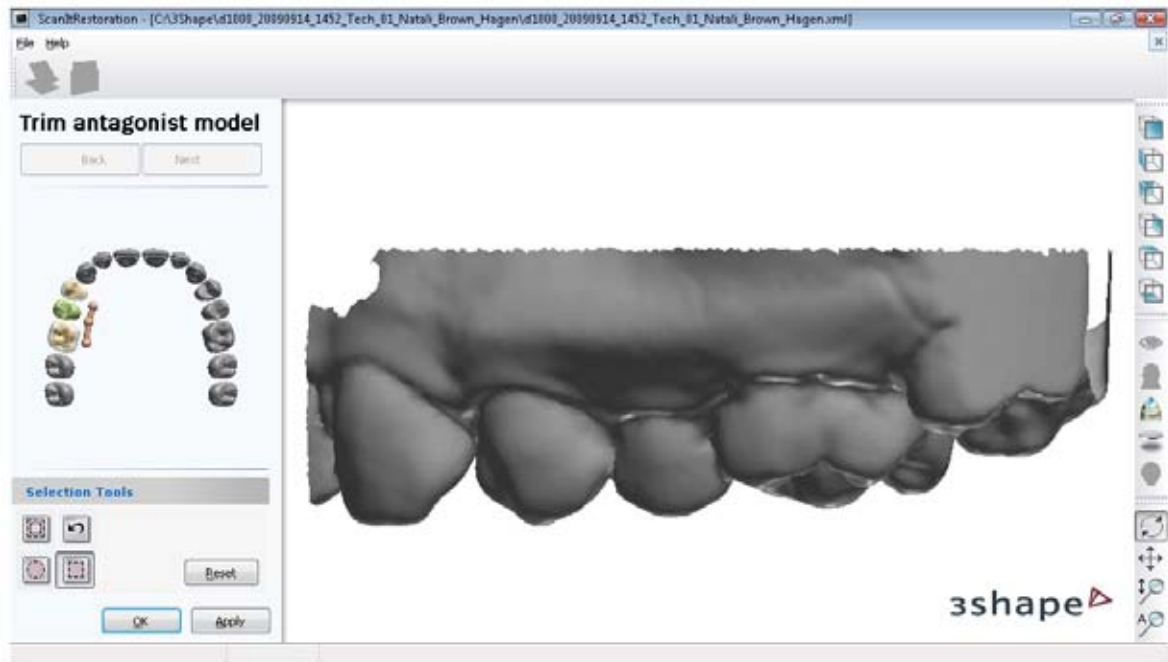
Once initial scanning is done, mark the area on the scanned antagonist arch for a detailed scan with the available tools and click **Continue** button.



You are able to do trimming of the scanned antagonist model if required at the next step. Mark the area to delete from antagonist model with the available tools and click **Apply** button.



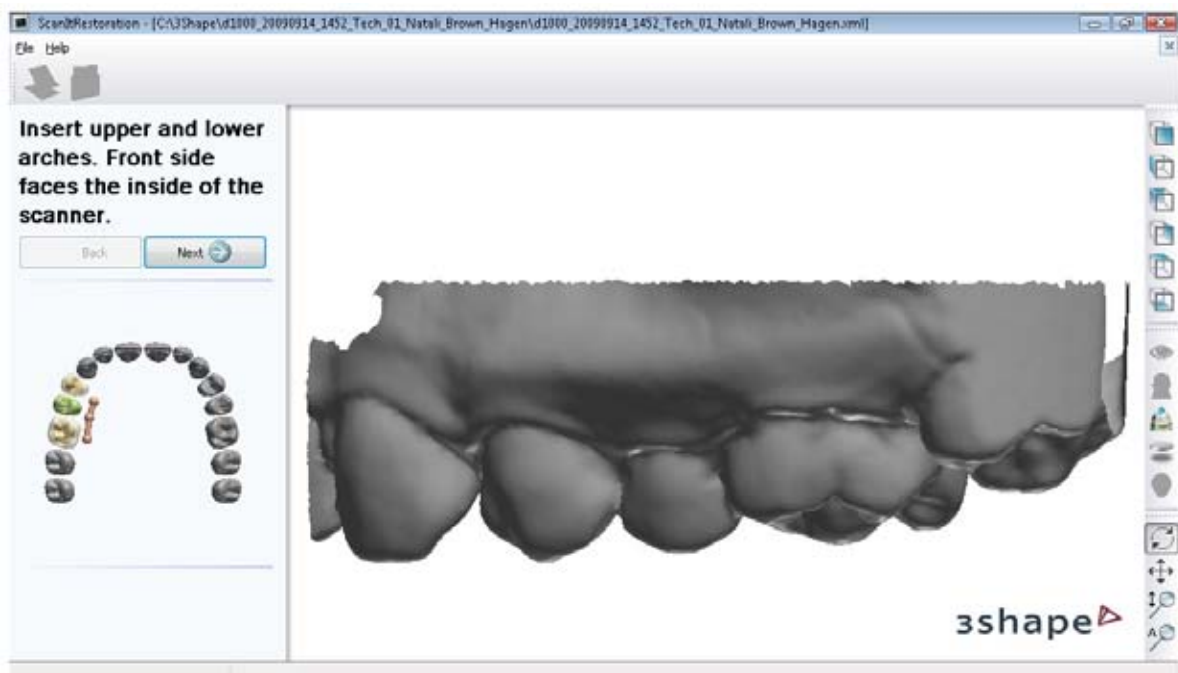
The antagonist model appears trimmed.



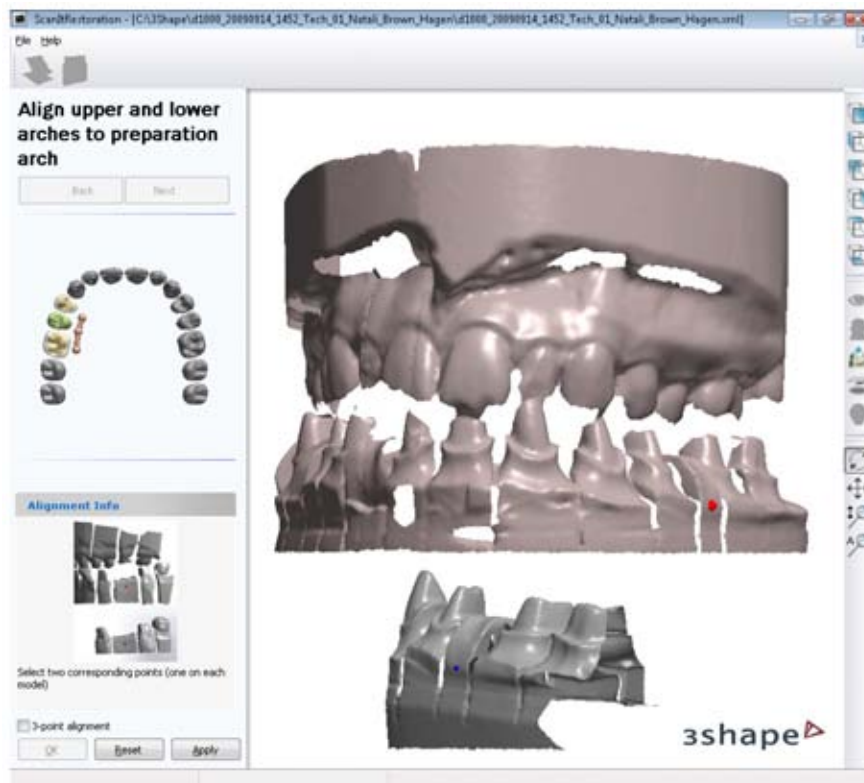
You should now mount both arches on the specially designed fixture, keeping the preparation arch below the antagonist and the front side of the teeth away from the metal bar of the fixture, as shown on the image to the left.

It is important to ensure that the objects are not movable on the fixture.

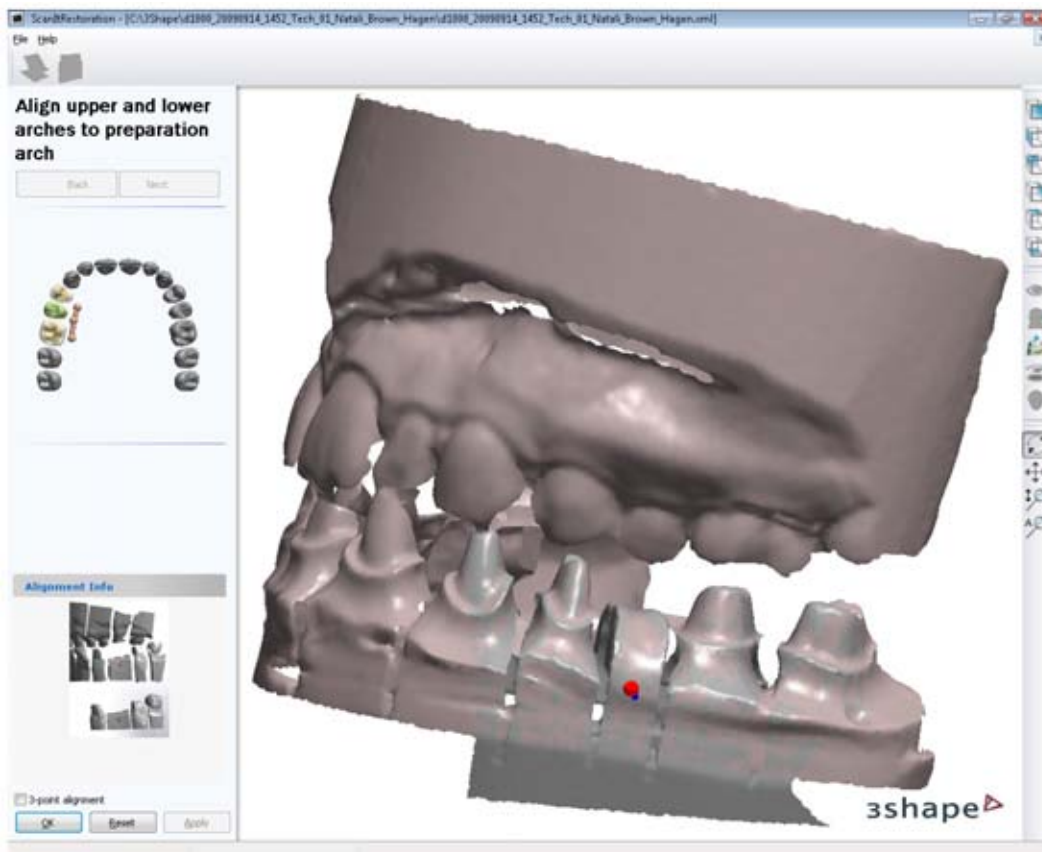
Then, insert it into the scanner with the front side facing the inside of the scanner and click **Next** to scan.



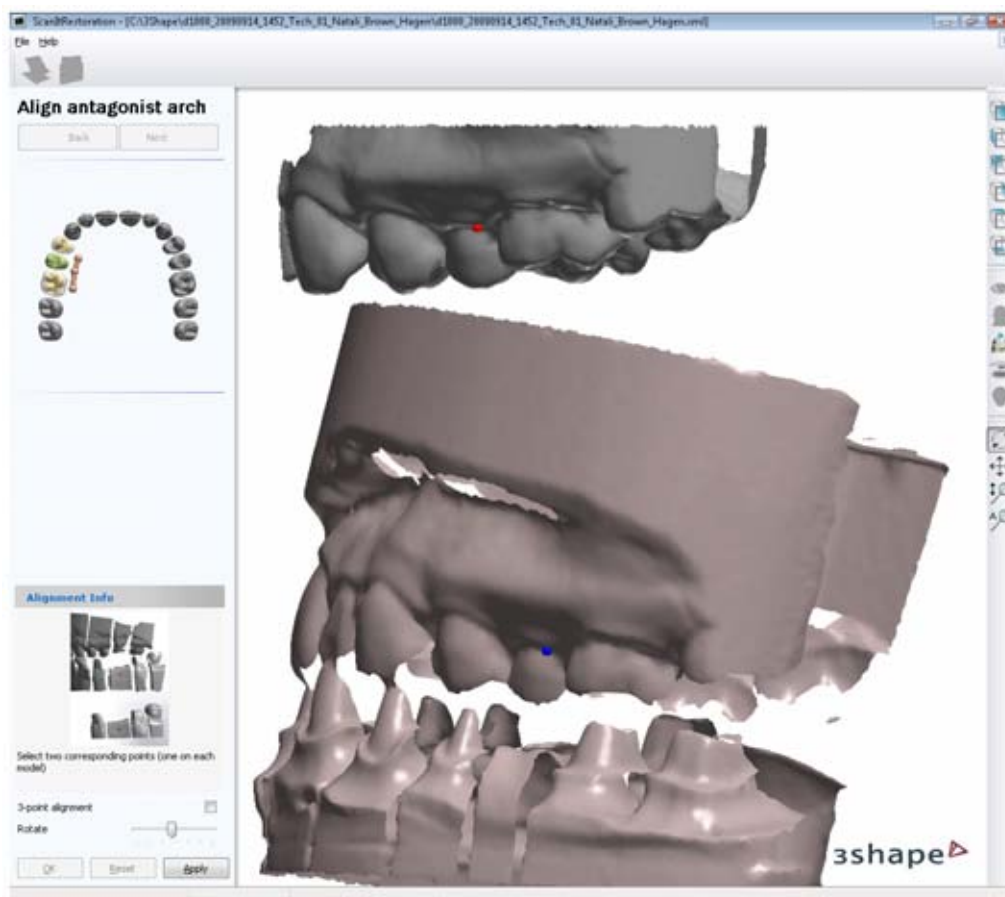
At the next step you are required to align upper and lower arches to preparation arch using either one or 3-points alignment method, click **Apply** button.



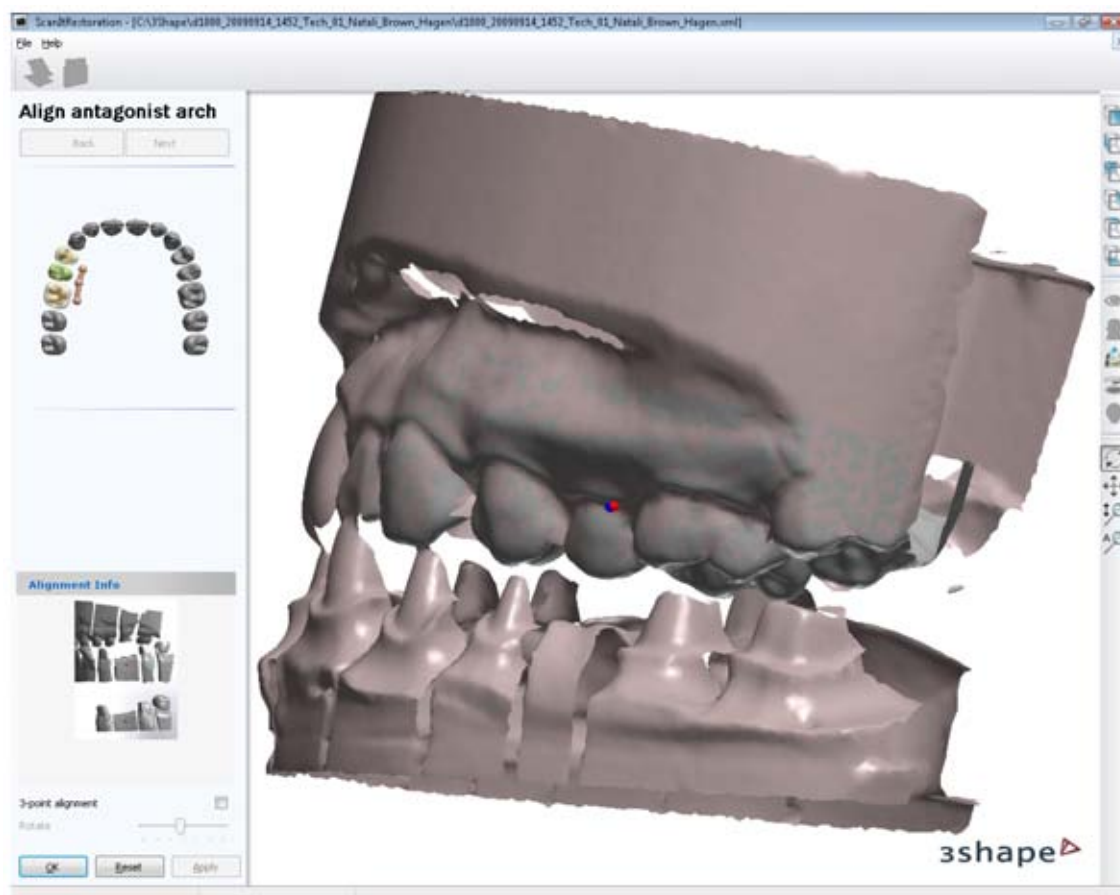
Example of aligned upper and lower arches to preparation arch is shown below:



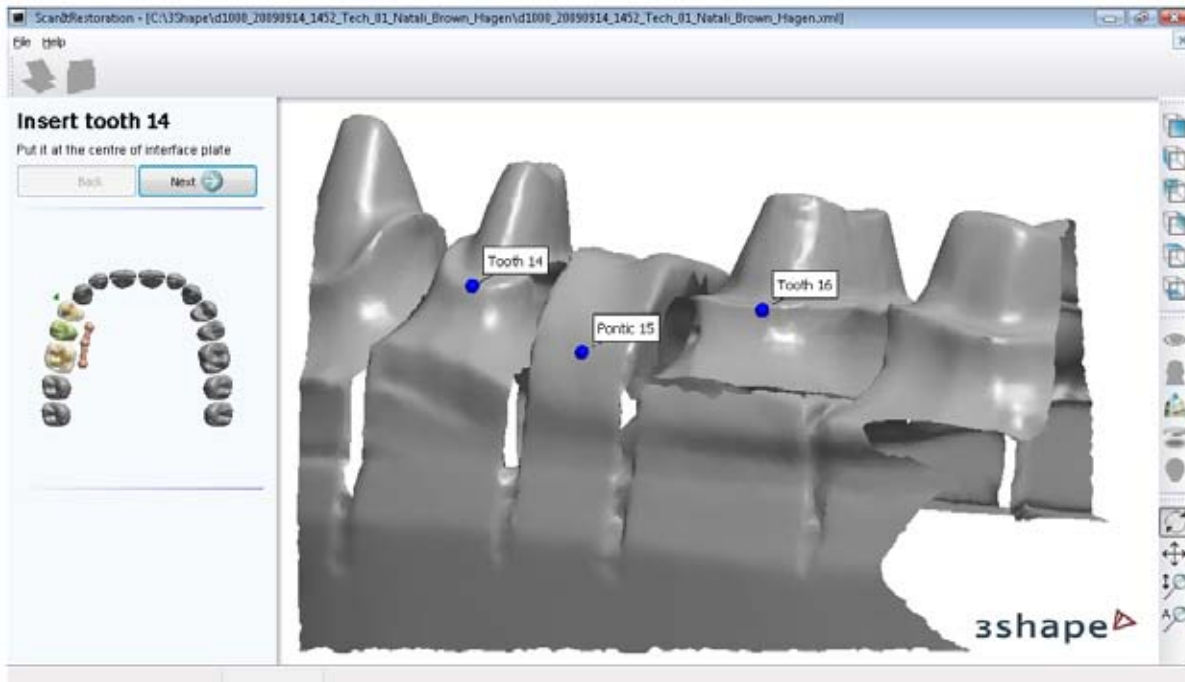
At the next step you are required to align antagonist arch to the model using either one or 3-points alignment method, click **Apply** button.



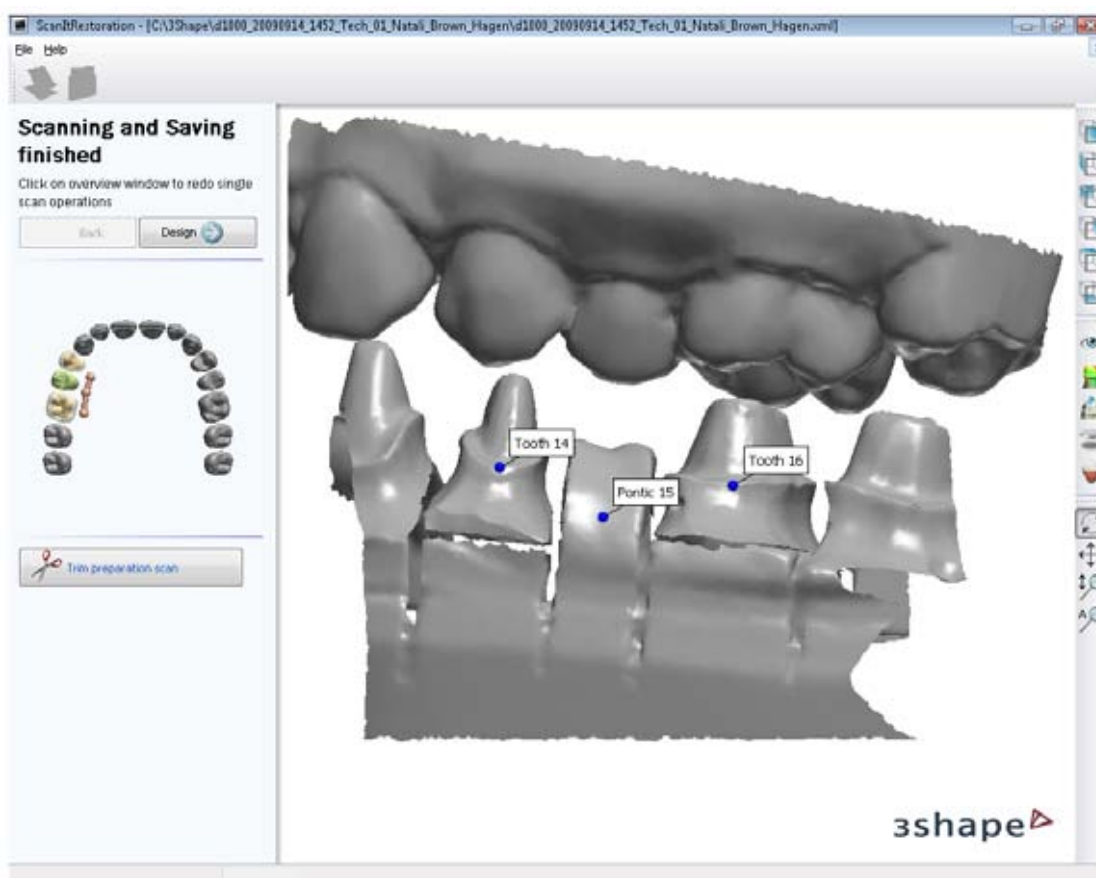
Example of aligned antagonist arch to a model is shown below:



Then you are required to scan each tooth separately by inserting them into the scanner as prompted by the software dialog.



Once scanning and saving is finished you can go straight to the modeling procedure by clicking the **Design** button or you can opt to trim the preparation scan first. When required, you can redo single scan operations, initiating them with a click on overview window.



3.2.16 Double Preparation

The Double preparation scan functionality allows you to scan one preparation twice, where the first scan contains some extra features (e.g. markers to aid later positioning, additional teeth etc.), and the second scan is the preparation itself.

If Double preparation scan is required, select the corresponding check-box in the Order form (**Scan settings** tab and create the order as usual.

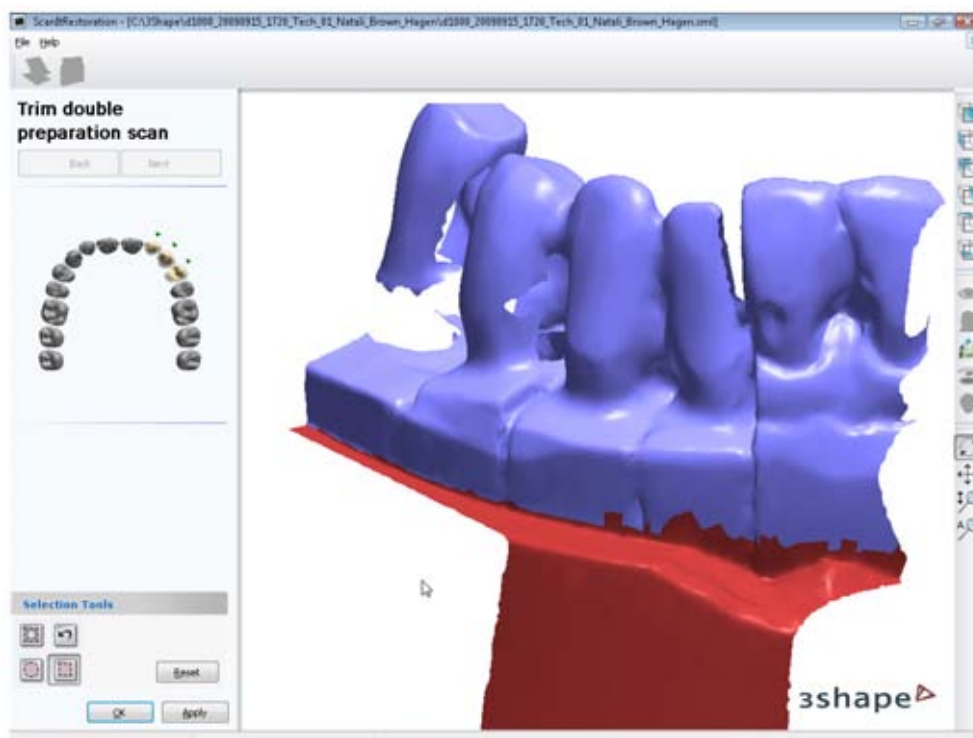
The created order appears in the DentalManager order list. Select your order and start ScanItRestoration by clicking **Next** or **Scan**. You can also start ScanItRestoration directly from the Order form by clicking the **Scan** button.

When the program opens up, insert double preparation arch into the scanner.

The scanning process will start when you click the **Next** button.



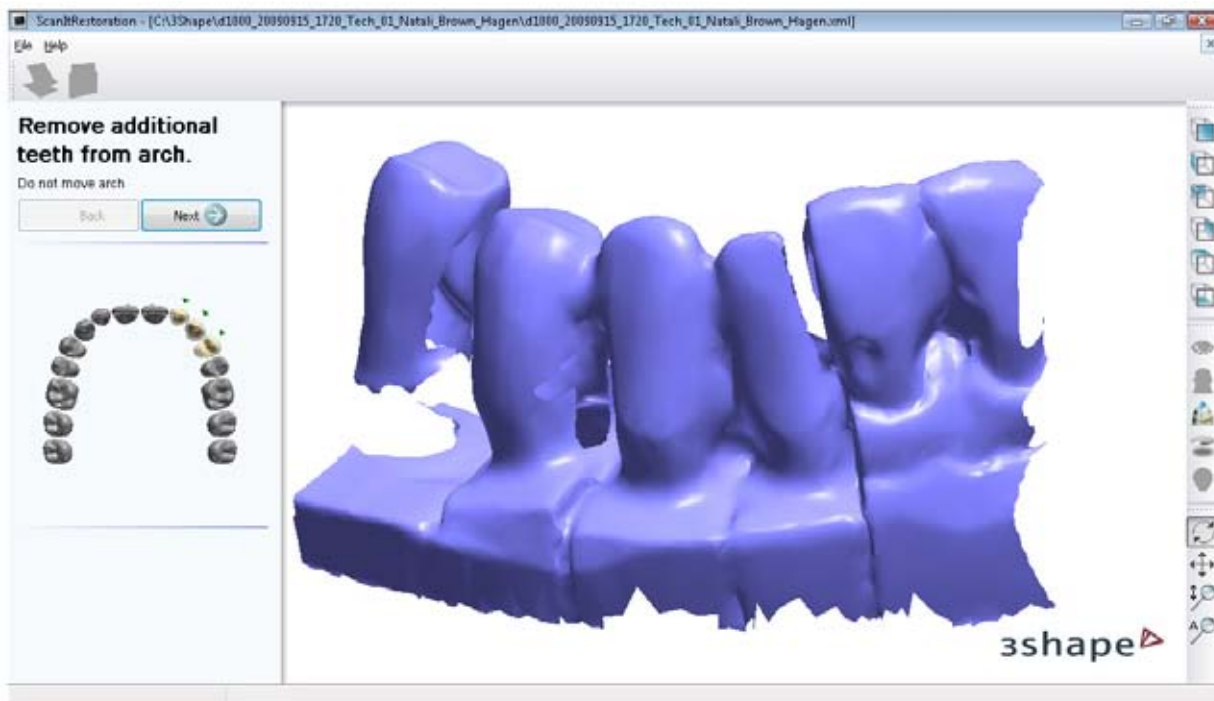
After the scanning process has been completed, the program will offer you to trim the scan. Pick one of the selection tools and trim your double preparation scan by selecting the desired part and clicking **Apply** or **OK**.



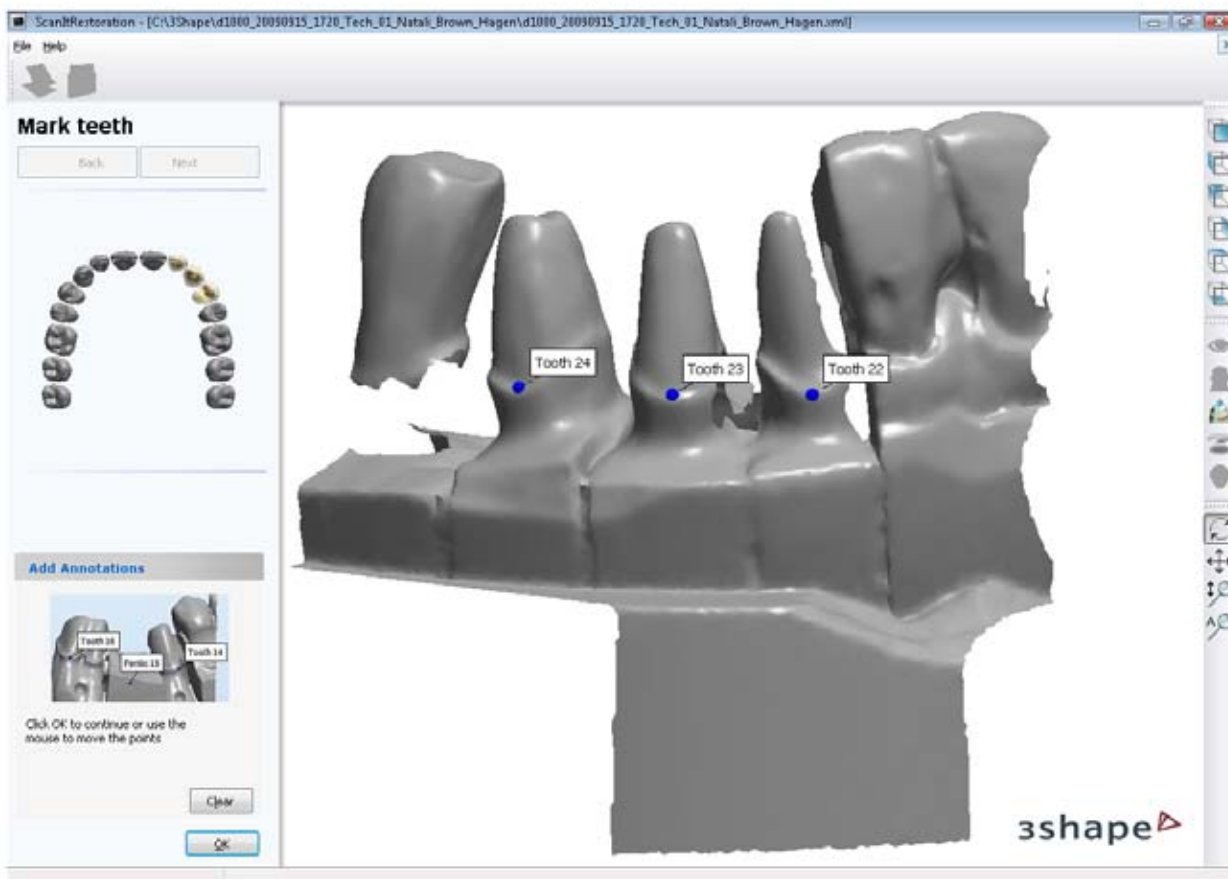
Carefully remove the additional information (e.g. teeth) from the arch so that the preparation could be scanned separately.



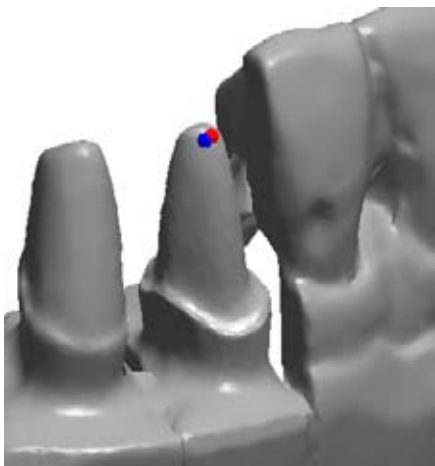
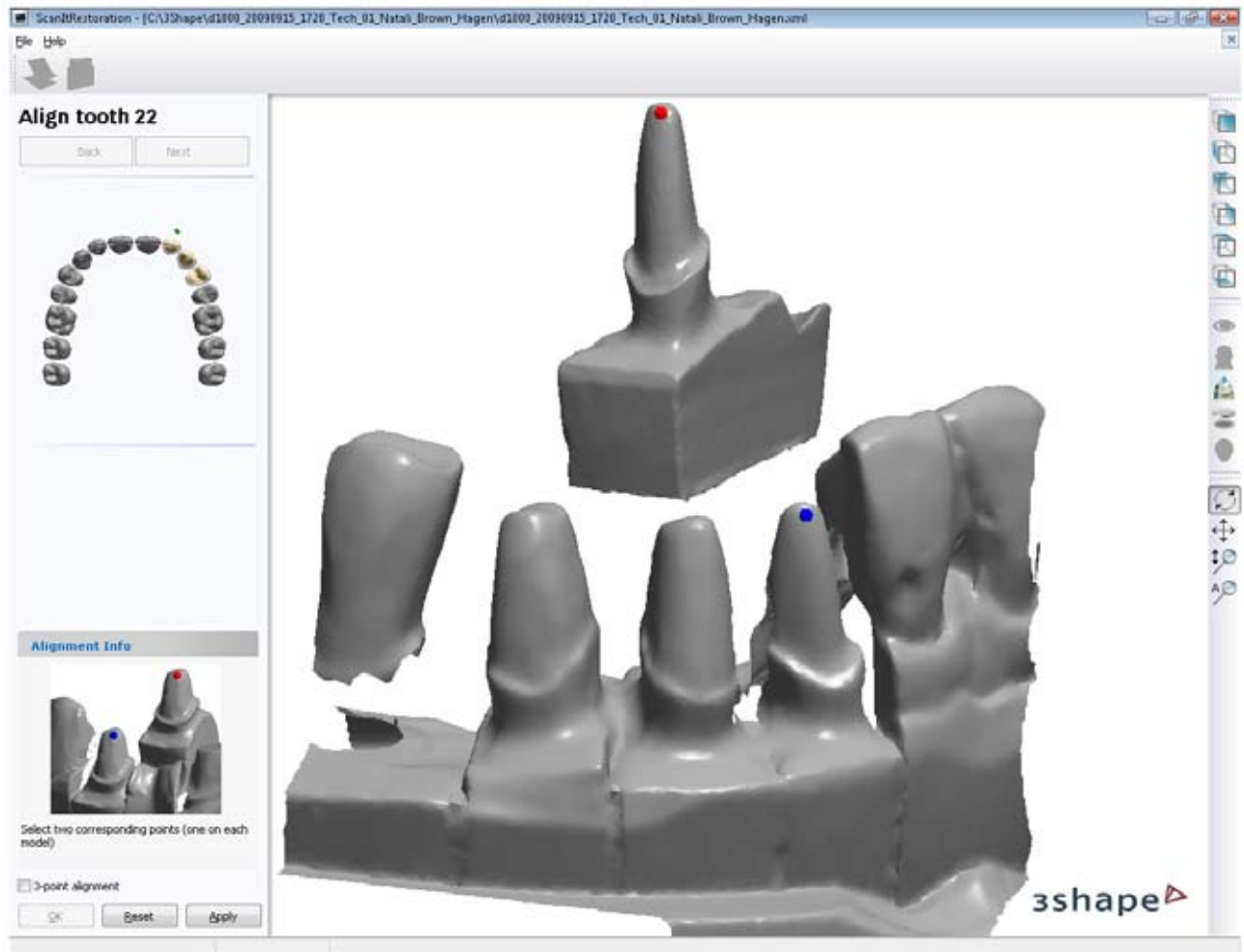
Caution! Do not move the arch. If the position of the arch has been changed, the alignment of the scans will not be successful.



After the preparation has been scanned you will be asked to mark the teeth with the annotation points and then insert the separate dies one by one for scanning.



After the first required die has been scanned, the program will automatically align it with the preparation. In some cases ScanItRestoration might ask you to do the manual alignment.

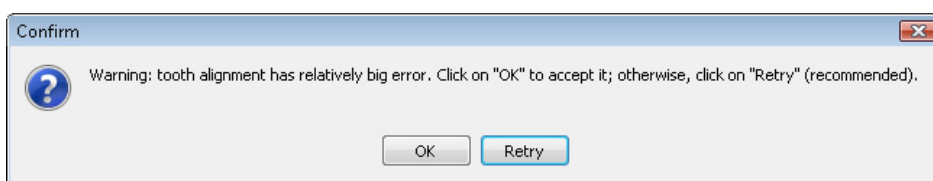


You can perform the alignment using two points or three points (for the latter select the 3-point alignment check-box).

The points should be placed on each model in approximately the same spots.

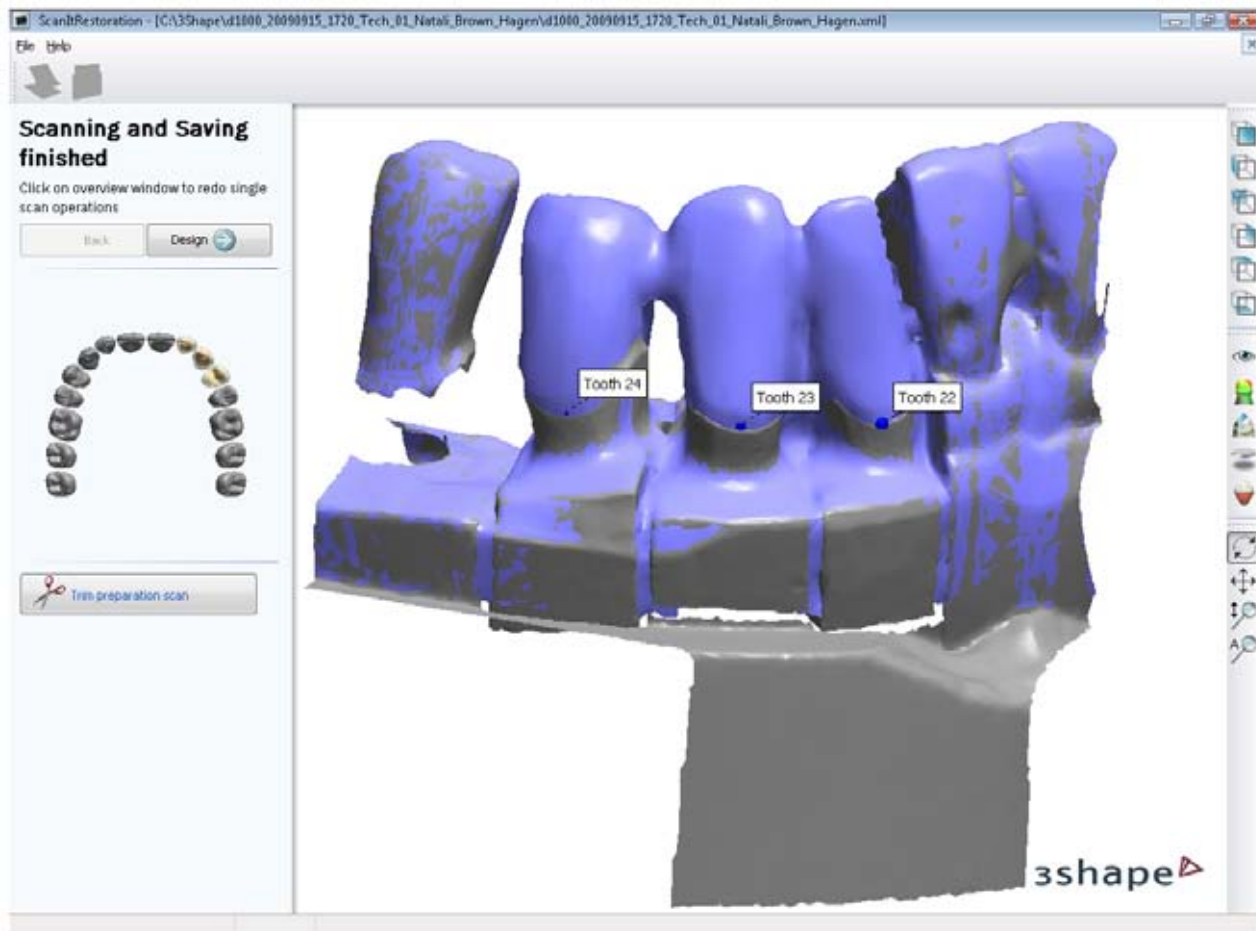
Click Apply to view changes (see image to the left), click Reset to start over.

If the manual alignment has been performed poorly, you will get the warning window as shown below. Click Retry (recommended) for realignment, click OK to accept it (not advisable!).



If the manual alignment has been performed poorly, you will get the warning window as shown below. Click Retry (recommended) for realignment, click OK to accept it (not advisable!).

After all the dies have been scanned and aligned one by one, the scanning process is over and your model is saved.



Click on the **Trim preparation scan** button if your final model needs to be trimmed.



If you need to re-scan or realign the die, you can click on the desired tooth in the Overview map and select the **Scan tooth** or **Align tooth** button. You can also view the Difference map if desired.

If you are satisfied with the result and want to start the modeling process in DentalDesigner, click the **Design** button.

It is not necessary to close down ScanItRestoration after each scanning process.

3.2.17 Pre-preparation

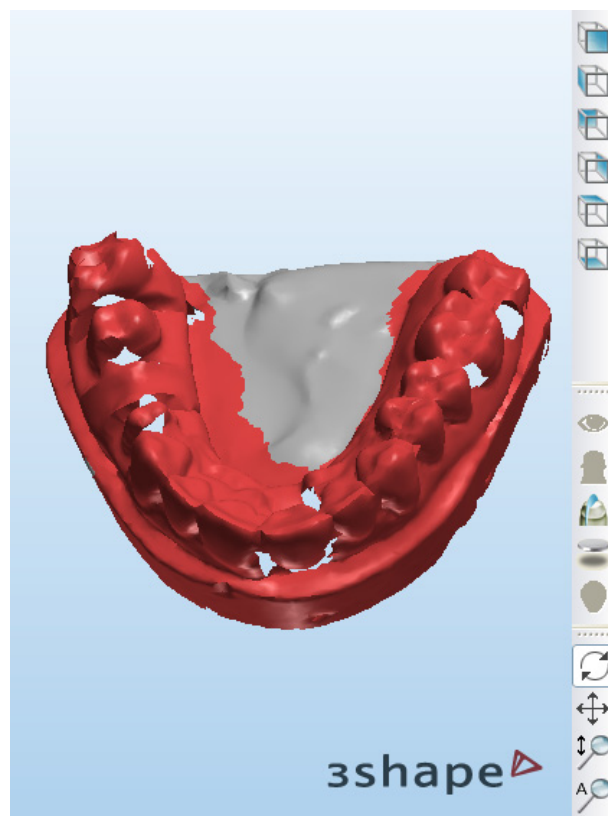
The pre-preparation model and diagnostic wax-up can now be scanned and aligned to the normal preparation scan and visualized during the design phase.

If pre-preparation scan is required, select the corresponding check-box in the Order form (**Scan settings** tab) and create the order as usual.



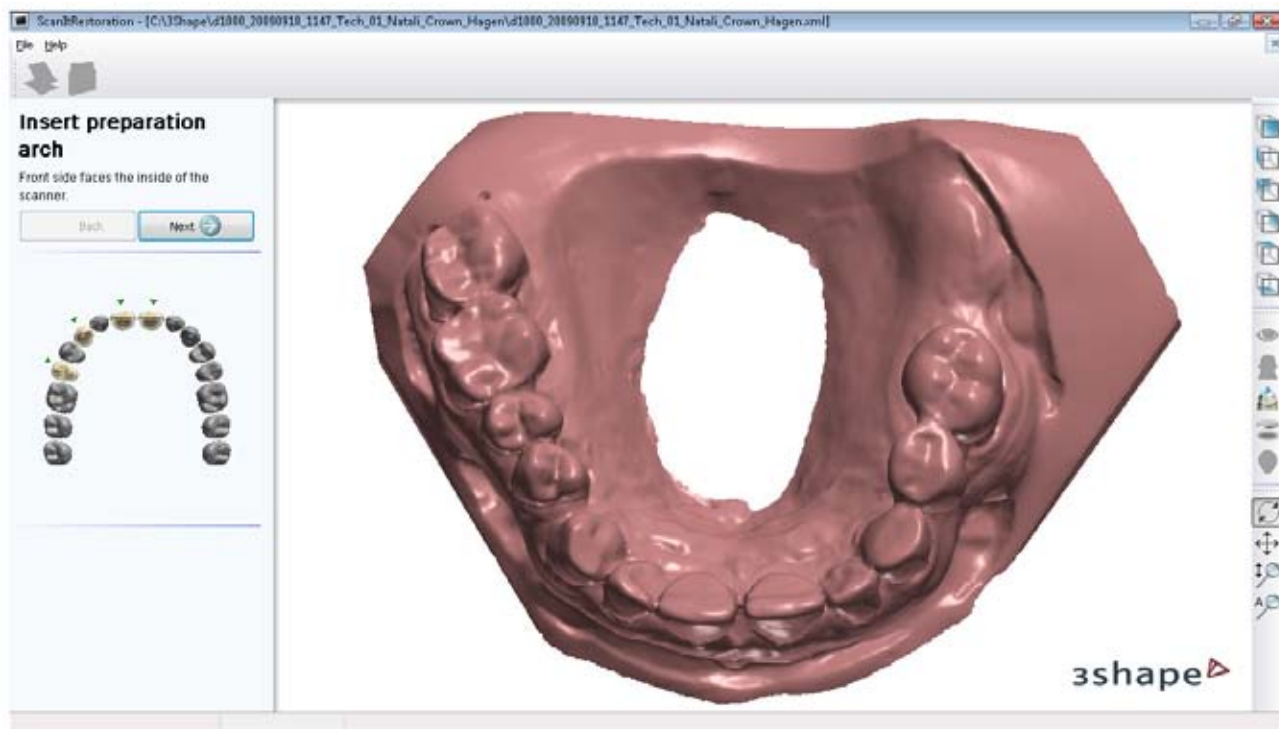
Having completed defining new order:

1. Click **Scan** button to proceed to the scanning step.
2. This opens ScanIt Restoration window asking you to insert pre-preparation arch.
3. Previously created orders i sent to scanning with the *Next* or *Scan* options available from the right-click menu on one of the created orders listed within DentalManager.
4. Click **Next** button to scan preparation arch.
5. Once the initial scanning is done, select the area on the scanned arch for a detailed scan with the available tools and click **Continue** button.

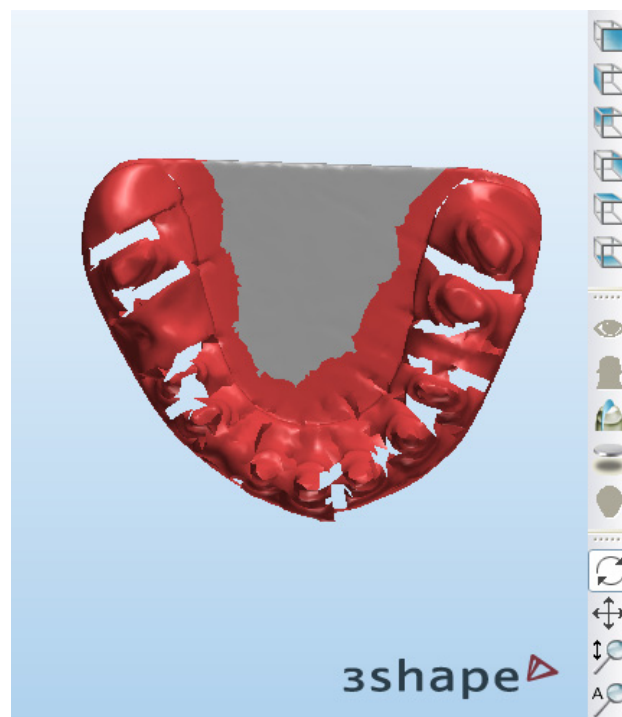


Detailed scan of the marked area is performed.

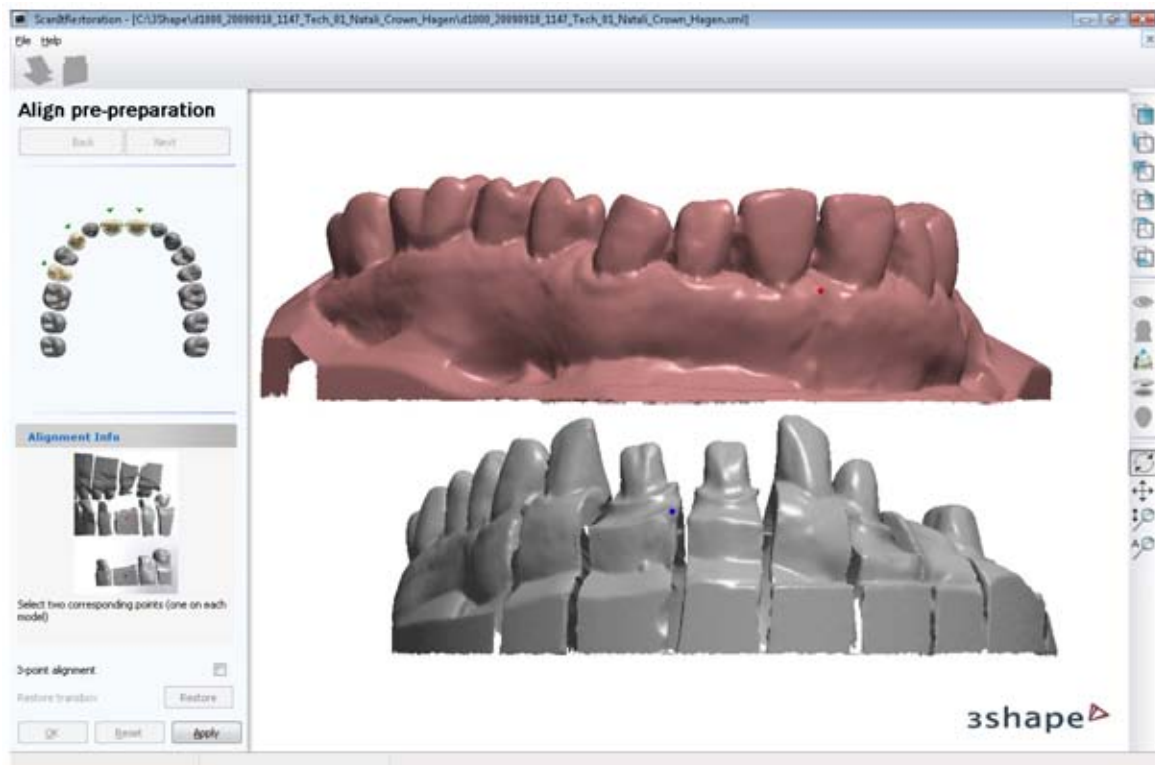
The next step requires you to remove pre-preparation arch and place preparation arch in the scanner. Click **Next** to perform scanning of the preparation arch.



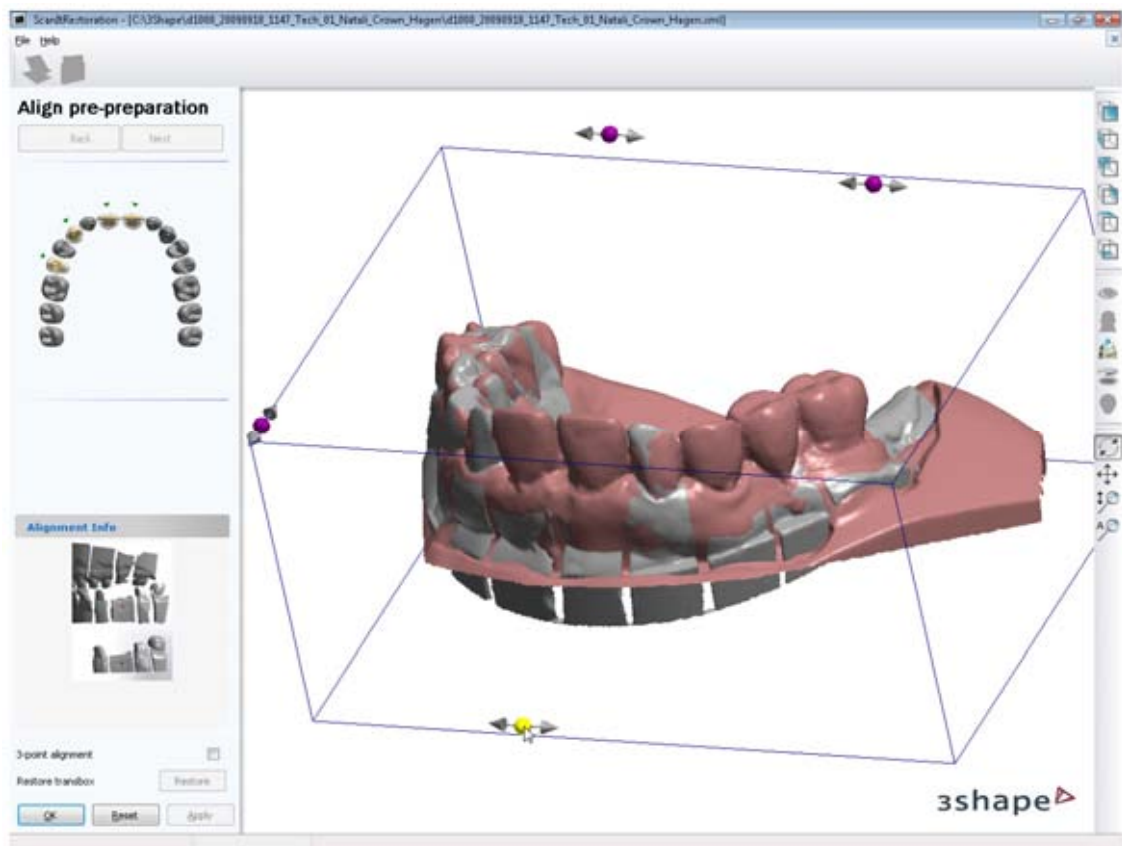
On completion of the initial scanning, select area for a detailed scan with available tools and click **Continue** button.



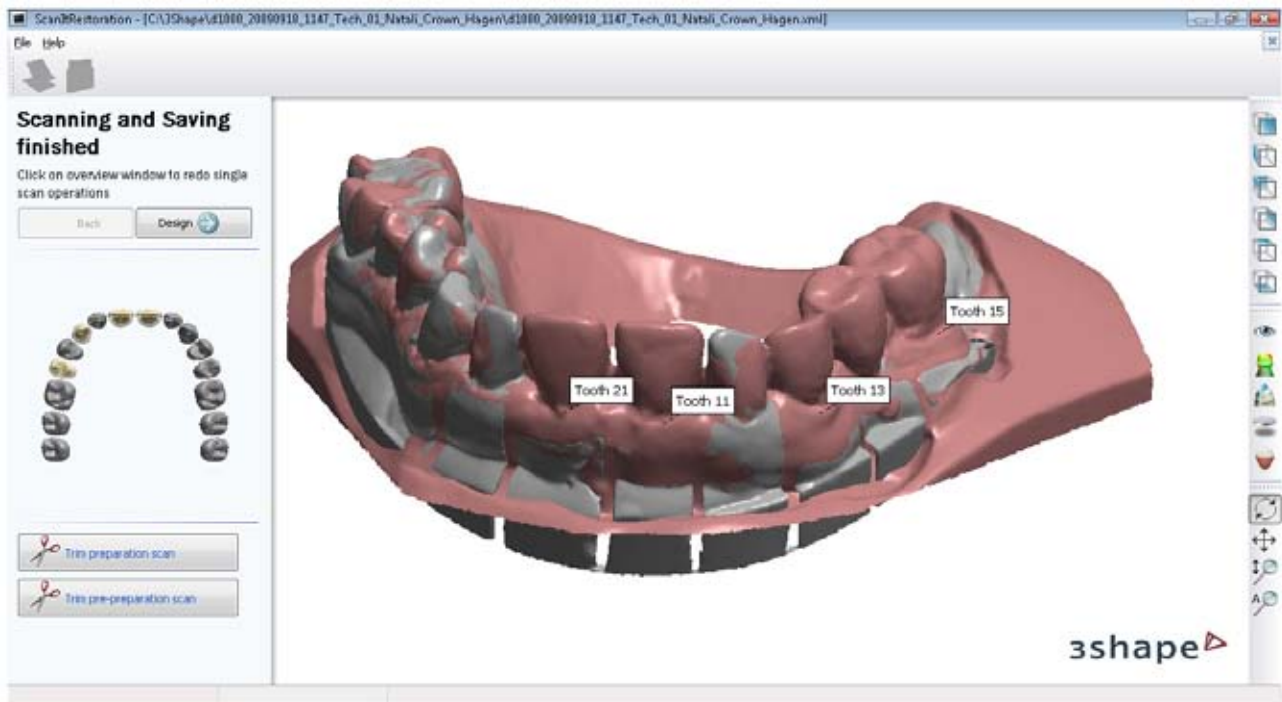
At the next step, you need to align pre-preparation arch using either one or 3-point alignment method by placing corresponding points accordingly.



You can select model with the cursor and rotate it in a desired direction with transbox points. Click **OK** button to complete alignment.

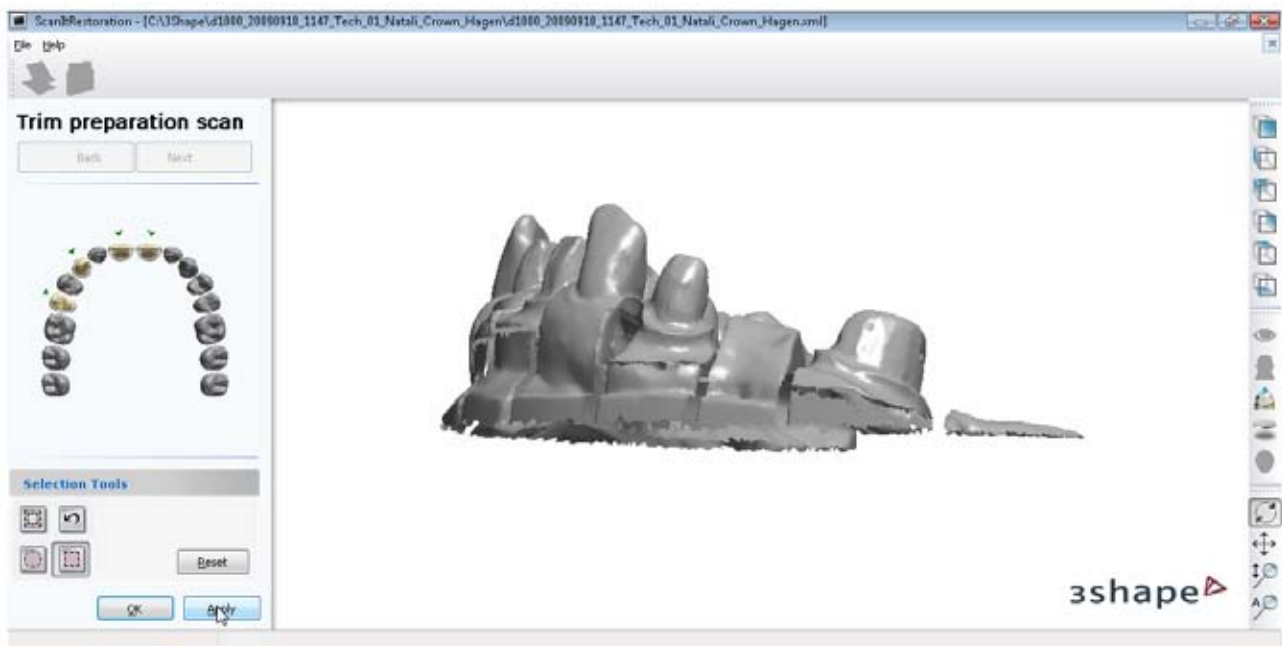


Point to mark corresponding teeth accordingly at the next step and click **OK** button.

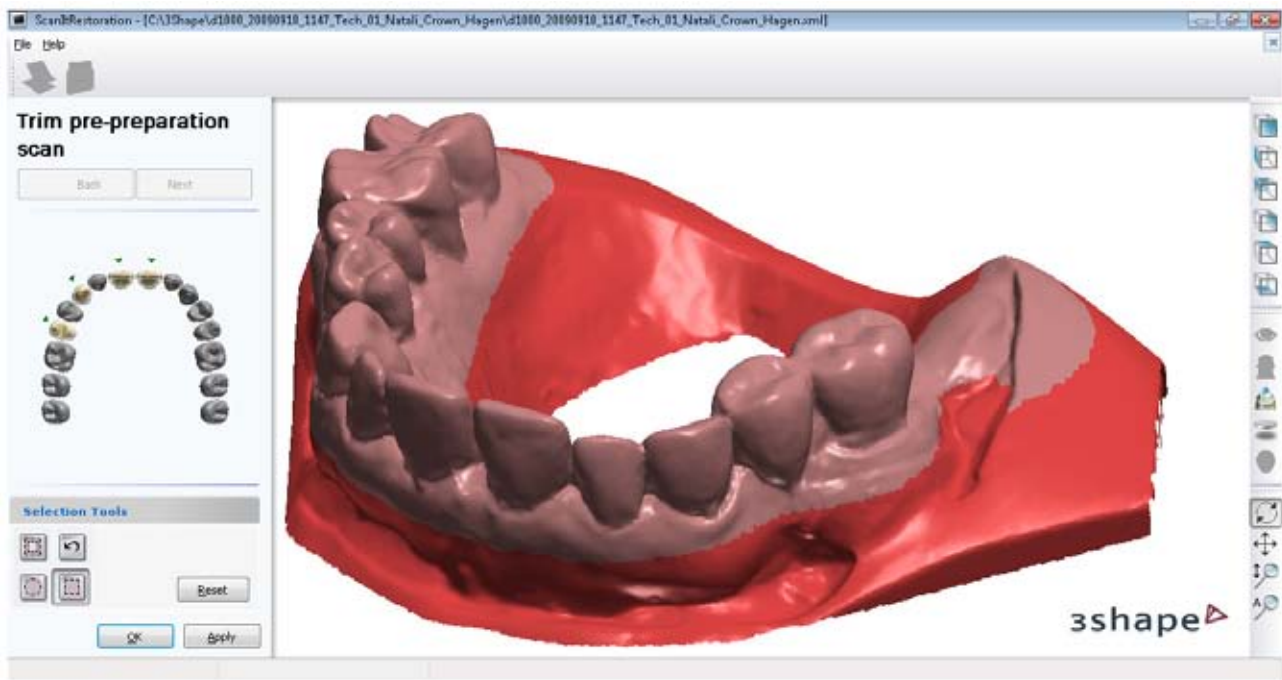


Examples of preparation and pre-preparation scans trimming steps are shown below:

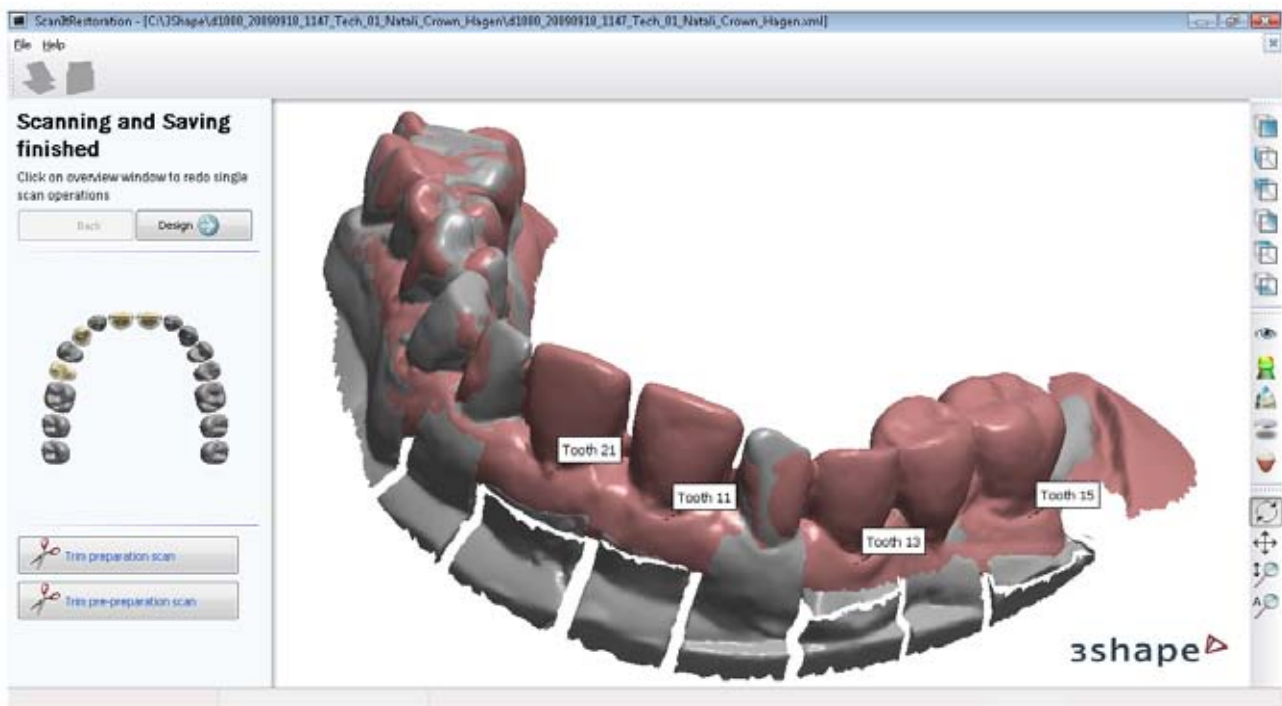
Example 1



Example 2

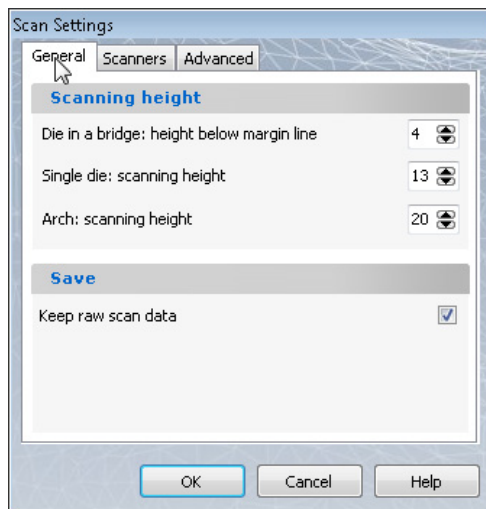


Example 3



3.3 Scan Settings

Select *File -> Scan Settings* from the main application window to modify settings for your particular case if necessary.



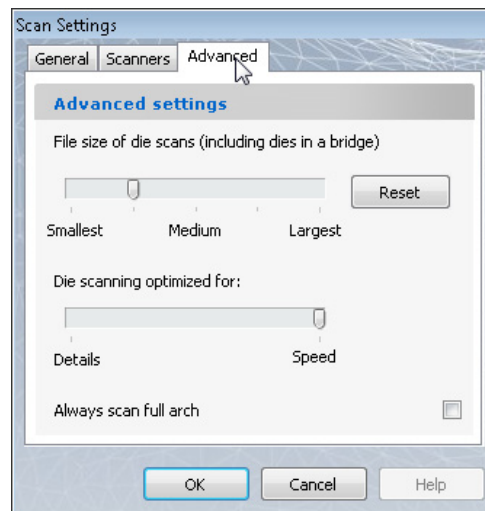
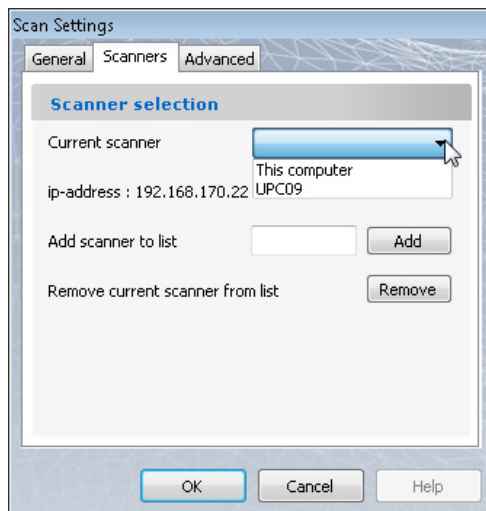
General:

Die in a bridge: height below margin line - when scanning an arch and then separate dies one by one, you annotate the teeth by placing the points on the margin line. This **Die in a bridge: height below margin line** parameter defines the distance down from the margin line that will be scanned.

Single die: scanning height - is the height of a single die that will be scanned (when arch is not used).

Arch: scanning height - is the height of the arch (from top down) that will be scanned.

Keep raw scan data - when checked, saves the raw scan files that can be used from reopening and editing saved orders.



Scanners:

Fill in your scanner's name/location in the **Add scanner to list** field (click **Add** to save) or select the required scanner from the **Current scanner** drop-down menu. Click **Remove** to remove the current scanner from the list.

Advanced:

File size of die scans slide-bar defines the number of points in the model. The smaller amount of points selected leads to a smaller file size and a less accurate model, while the larger one to a bigger file size and a more accurate model.

Die scanning optimized for slide-bar is used when scanning separate dies only. If you choose Details, the scanned model will be of high quality but the scanning process will be very slow. If Speed is selected, then the scanning process will be fast resulting in a good model quality.

Always scan full arch - when checked, the program requires only a detailed scanning of a full arch; when it is not checked, both an overview and detailed scans are required.

4 Scanning Impressions - ScanItImpression

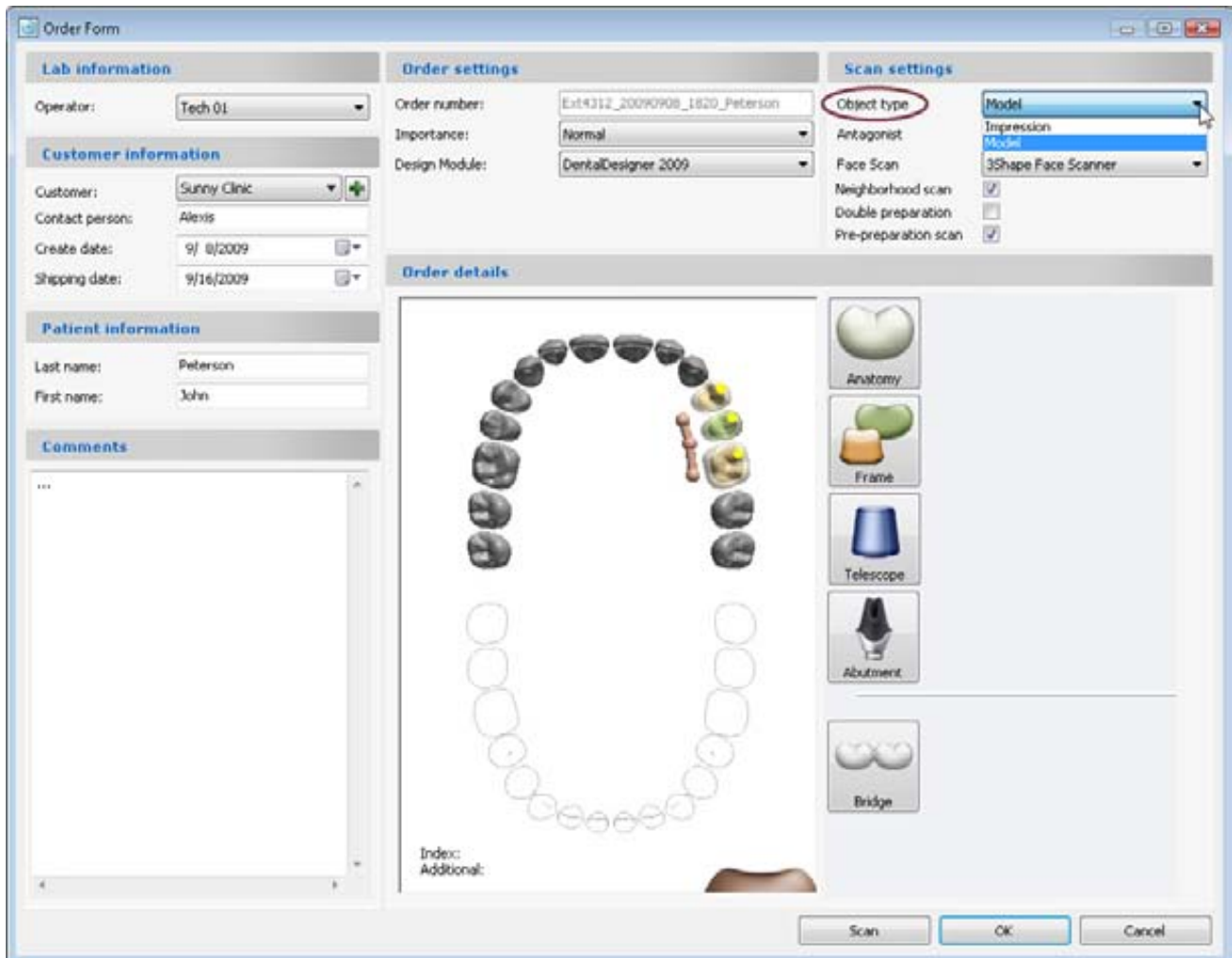
The ScanItImpression add-on module is started from DentalManager and allows producing digital models directly from impressions.

When configured with the ScanItImpression add-on module, Dental System 2009 supports the design of restorations on the basis of adaptive impression scanning. ScanItImpression is started automatically, when required by an order created in DentalManager. With this application you can scan impressions and then design restorations in DentalDesigner. In addition, ScanItImpression allows you to create/trim a virtual model (replacing the traditional stone/gypsum model), that can then be produced by rapid prototyping in parallel to the manufacturing of the actual restoration.

ScanItImpression can scan the vast majority of typical restoration impressions. However, if a prepared tooth has a depth to width ratio larger than approx. 1.5, the accuracy in the deepest part of the impression may be marginally compromised.

4.1 User Interface

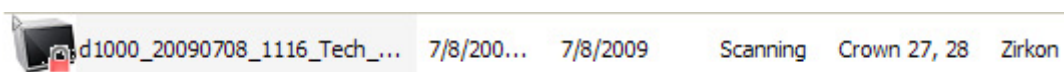
To start working with ScanItImpression you have to first define your order in the Order form (see *Creating Orders* chapter for more details). Open an Order form in DentalManager, select *Impression* as an object type in **Scan settings** and click **OK** to save the order. The order now appears in the Dental Manager list of orders with the status *Created*. If you want to start the scanning process immediately, click on the **Scan** button - this will bring you directly to ScanItImpression.



Otherwise, select the created order from the list and start ScanItImpression by clicking **Next** or **Scan** button in the Main toolbar or right-clicking on the order and selecting **Next** or **Scan** from the right-click menu.



On starting ScanItImpression the order in the list changes its icon to locked for scanning:



ScanItImpression window opens asking you to insert your impression with the preparation side up.



Show low quality areas button can be used to validate the accuracy of the scan: if important areas are of a low quality, the impression should be visually compared to the scan.

After scanning has been completed successfully, the orders change their status from *Created* to *Scanned* as illustrated below in the DentalManager order list.

The screenshot shows the 3Shape Dental Manager 'Orders' window. The 'Inbox' tab is selected, showing 2 orders. The table below lists the orders with their details. The order with ID 20135_20090818_1606_Tech_01 is highlighted with a red oval, showing its status as 'Scanned'.

Number	Creation date	Shipping date	Delivery date	Client	Items	Material	Status	Height
20090908_1427_Tech_01	9/8/2009 2:47:23 PM	9/21/2009	9/8/2009	Bolton Lab	Coping 30, Crown 30	Wax,Zirkon	Modelled	6.48 mm
20090908_1449_Tech_01_John_Peterson	9/8/2009 2:53:38 PM	9/16/2009	9/16/2009	Smile Dental	Coping 30, Crown 30	Wax,Zirkon	Accepted	-/-
20090908_1500_Tech_01	9/8/2009 3:13:00 PM	9/16/2009	9/16/2009	Smile Dental	Frame bridge 23-25	Zirkon	Shipped	-
20135_20090818_1606_Tech_01	8/18/2009 4:09:41 PM	8/18/2009	8/18/2009	ABC Lab	Frame bridge 5-12	Zirkon	Scanned	-
20135_20090819_1005_Tech_01	9/8/2009 2:54:10 PM	8/19/2009	8/19/2009	Sunny Clinic	Crown 30	Wax,Zirkon	Modelled	6.99 mm
20135_20090819_1417_Tech_01	9/8/2009 2:54:43 PM	8/19/2009	8/19/2009	Sunny Clinic	Frame bridge 2-4	Wax,Zirkon	Modelled	9.44 mm

4.2 Preparing for Scanning

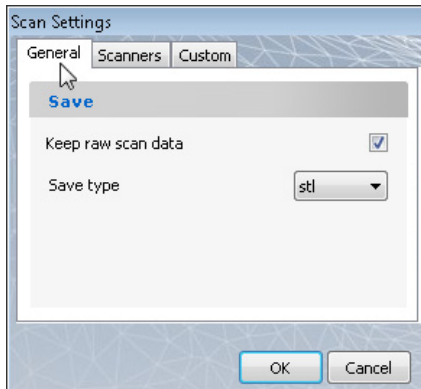
Here are a couple of suggestions on how to prepare for the adaptive impression scanning in order to achieve good results:

1. Trim the physical impression with a knife prior to scanning, cutting away as much excessive material as possible. This is very important because there can be a lot of impression material in irrelevant areas, which would prevent the cameras from seeing into the impression.

2. Before scanning, apply scan powder to the impression using a brush (or use a scan spray). It is important that the spray/powder is carefully applied over the entire impression as well as the tray, as uncovered areas may affect the overall result. This procedure is highly recommended – unless scanning a 3Shape-approved impression material.

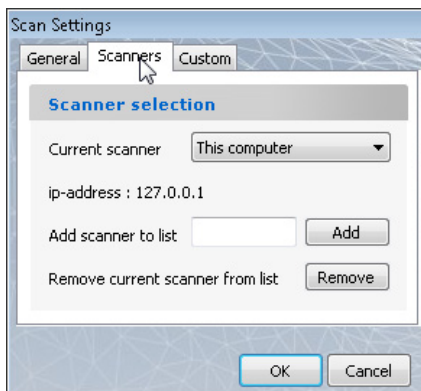
4.3 Scan Settings

Select *File* -> *Scan Settings* from the Main toolbar to modify settings for your particular case if necessary.



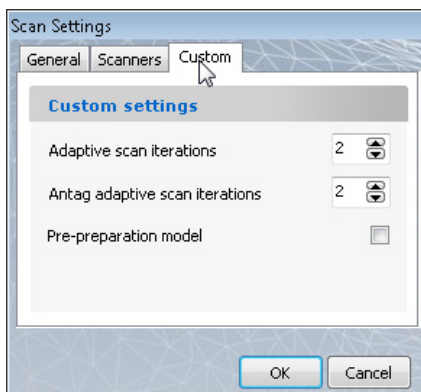
General

Keep raw scan data - when checked, saves the raw scan files that can be used for reopening and editing saved orders.



Scanners

Fill in your scanner's name/location in the **Add scanner to list** field (click **Add** to save) or select the required scanner from the **Current scanner** drop-down menu. Click **Remove** to remove the current scanner from the list. In most cases the default *This computer* is the correct setting. Only in rare cases will the user want to scan on another PC.



Custom

Adaptive scan iterations - the number of scan iterations for the preparation side.

Antag adaptive scan iterations - the number of scan iterations for the antagonist.

Pre-preparation model - when checked, flips model after scanning.



If necessary, you can modify *Virtual Trim Settings* accessed via the File menu.

Pin Height - the height of the pin below the die.

Artificial Surface depth - a distance from the margin line at which the preparation model meets the die.

Margin Line Angle - an angle of a slope down to the margin line.

Slope height - a distance from the margin line to the pin.

Pin spacing - a gap between the pin and the model.

Cylinder offset - an offset applied to the margin line for creating the additional cavity space.

Surface thickness - an inward offset of a model used for 3D printing optimization.

Bottom hole size - the size of holes at the bottom of the platform used to let the liquid for 3D printing to drain out.

Pushing height - facilitates pushing the dies out of the model.

4.4 Scanning Steps

In this section you will find a detailed description of how to scan an impression with and without the antagonist.

4.4.1 Antagonist: None

Scan settings	
Object type	Impression
Antagonist	None
Face Scan	None

Before scanning an impression define your order in the Order form. Select *Impression* as an object type and *None* for the antagonist (no antagonist will be scanned). Click **OK** to save your order which will appear in the DentalManager order list with the status *Created*.

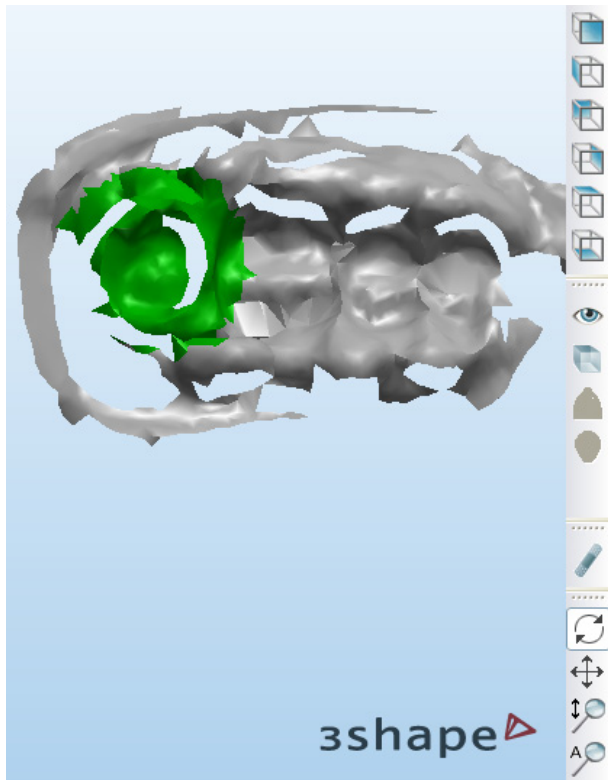
You can also start ScanItImpression directly from the Order form by clicking the **Scan** button. Otherwise, select the created order from the DentalManager order list and start ScanItImpression by clicking **Next** or **Scan**.

Insert Impression with preparation side up

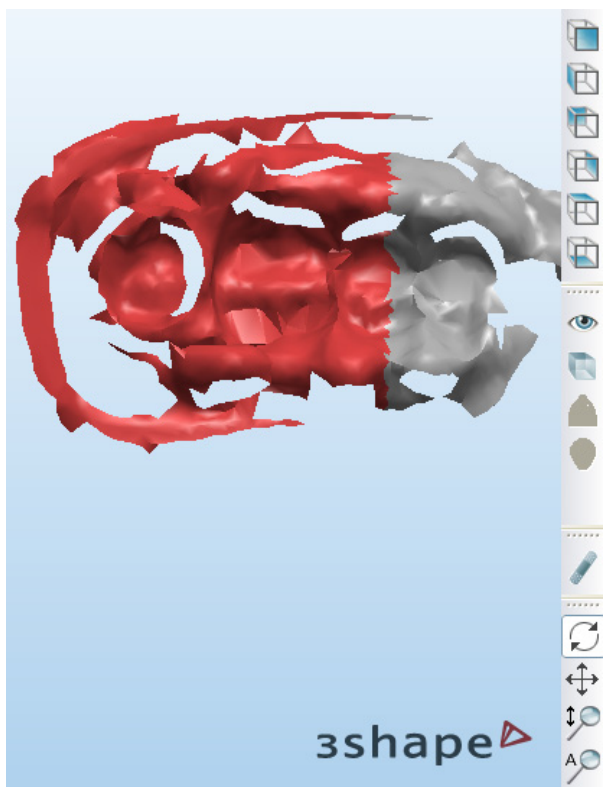
Back
Next

When the program opens, insert the impression model into the scanner and click **Next** button to initiate the scanning process.

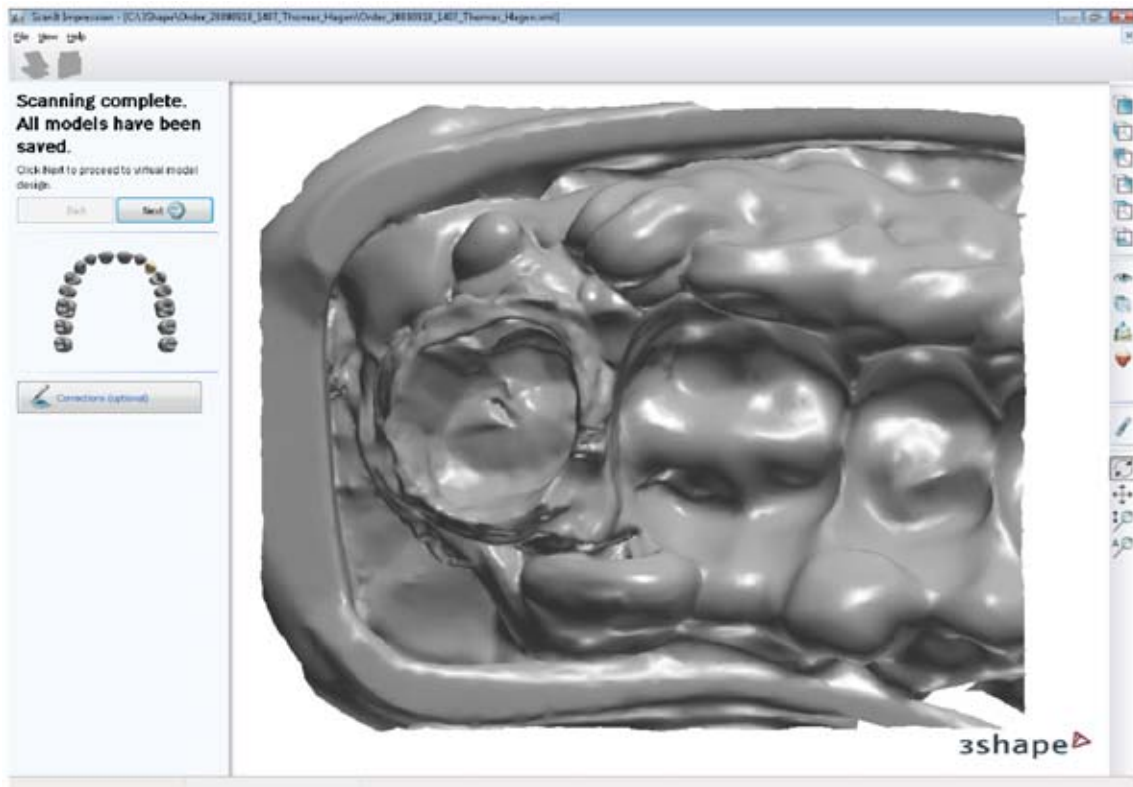
A fast overview scan is performed and on the screen. The application asks you to mark the teeth included in your order. Select each preparation individually, and click **Continue** between each one.



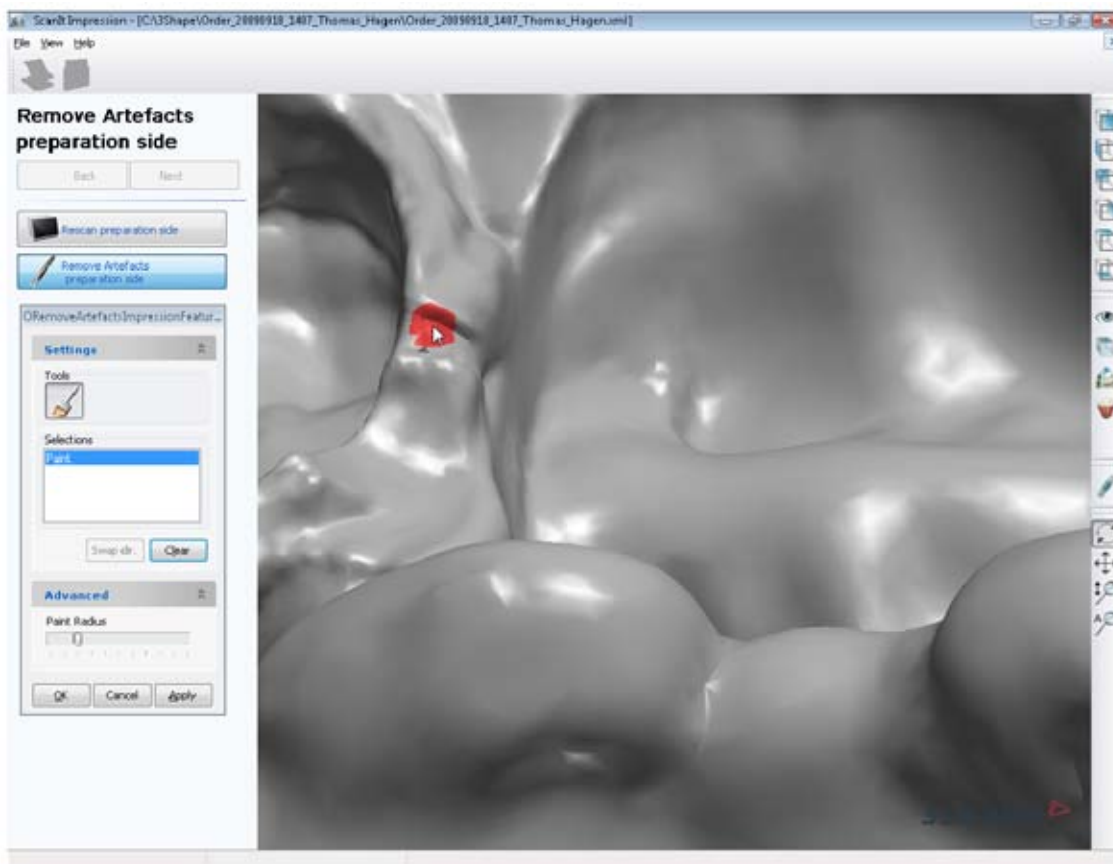
Next, you are prompted to mark the region of interest as shown on the image below. This is the region containing all preparations and any desired adjacent teeth. Click **Continue** when done.



On completion of the process all models become saved and you can then do optional corrections if needed.



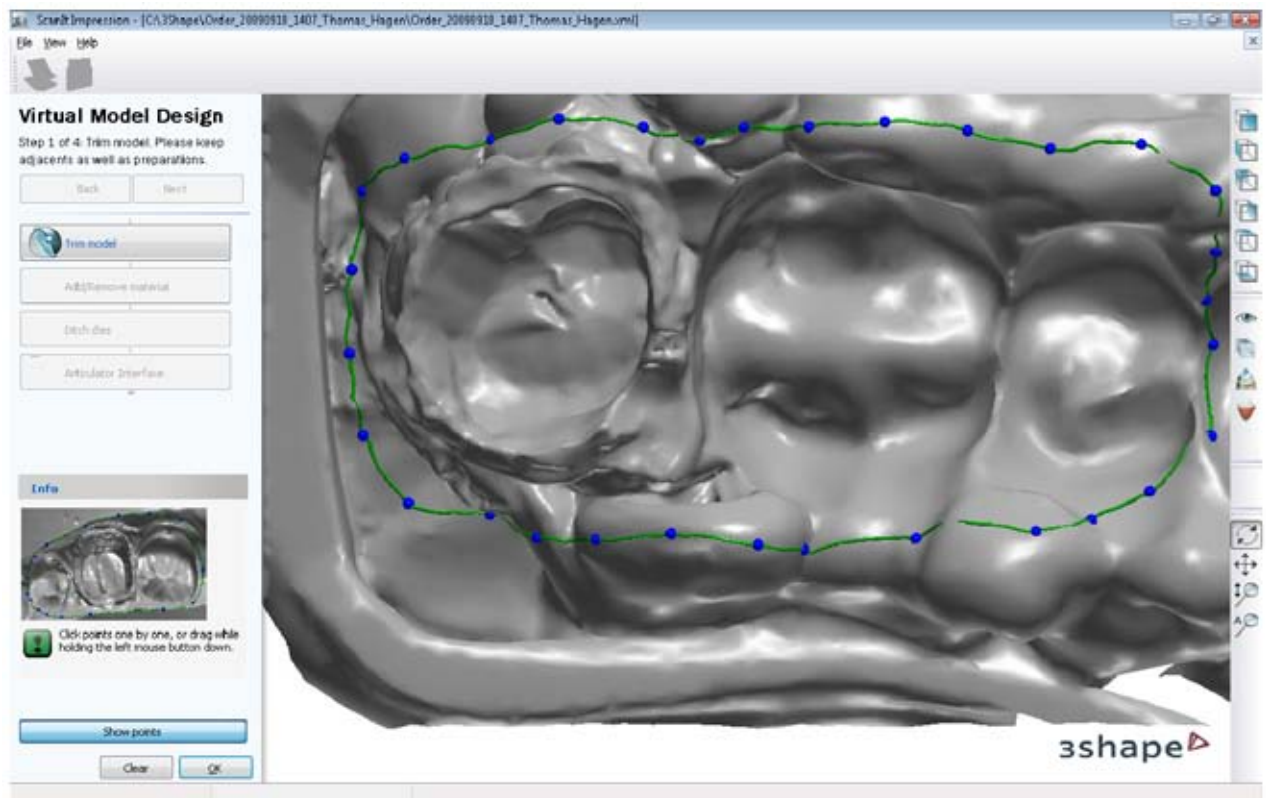
Click the **Corrections (optional)** to use the **Rescan preparation side** and **Remove Artefacts** buttons if necessary.



Click **Next** to go to the *Virtual Model Design* step and do trimming of the model.

4.4.2 Virtual Model Design

Once trimming of the model has been performed, click **OK** to continue.

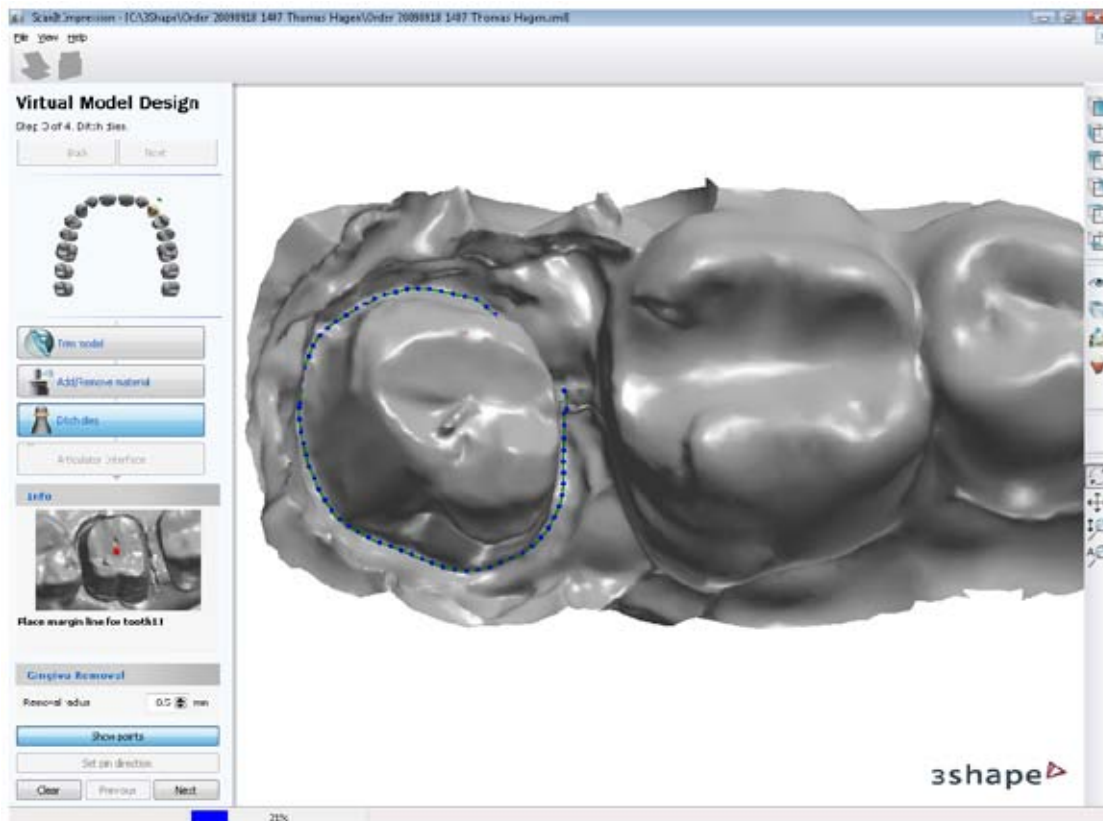


The *Add/Remove material* stage is an optional stage that can be used to modify the impression (e.g. correct flaws in the preparation or remove gum tissue).

The next virtual modeling operation is to ditch the dies. A margin line must be defined for each preparation. Click a point on the top of the displayed tooth: the software will automatically find the margin (which can be edited as usual). Alternatively, the margin can be drawn by dragging the mouse. Click **Next** to continue.

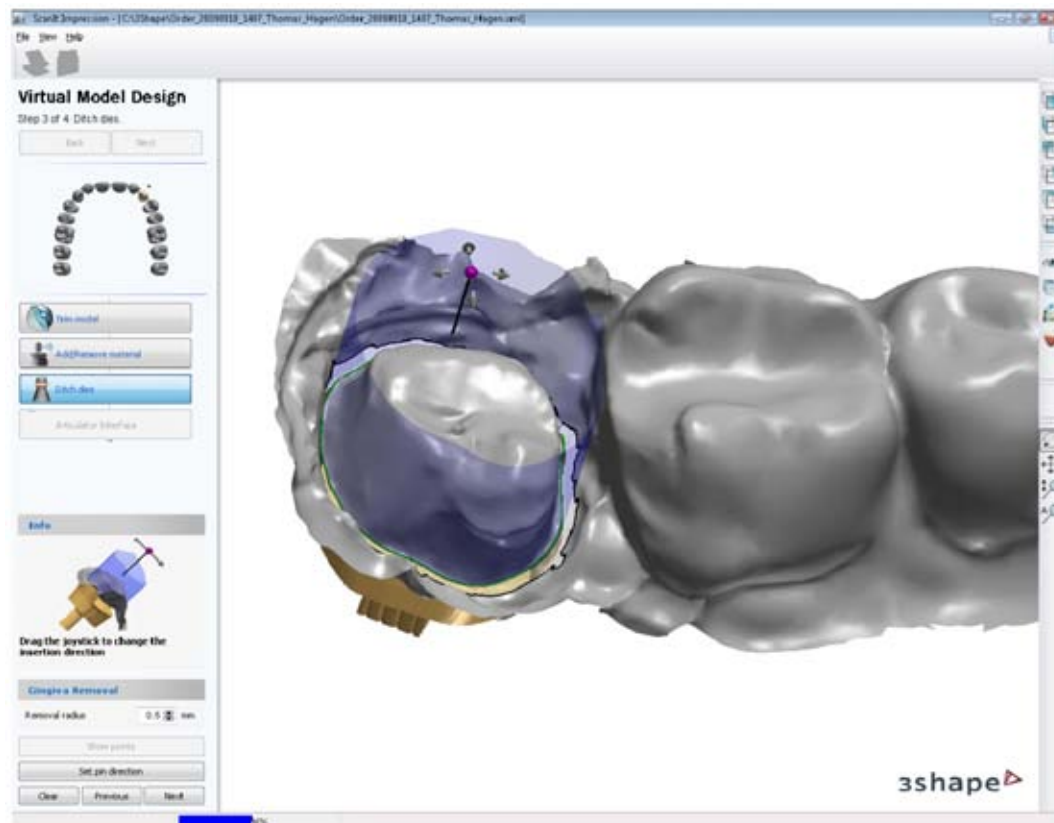


Note! 3Shape highly recommends that the dentist prepares using an exposed margin.

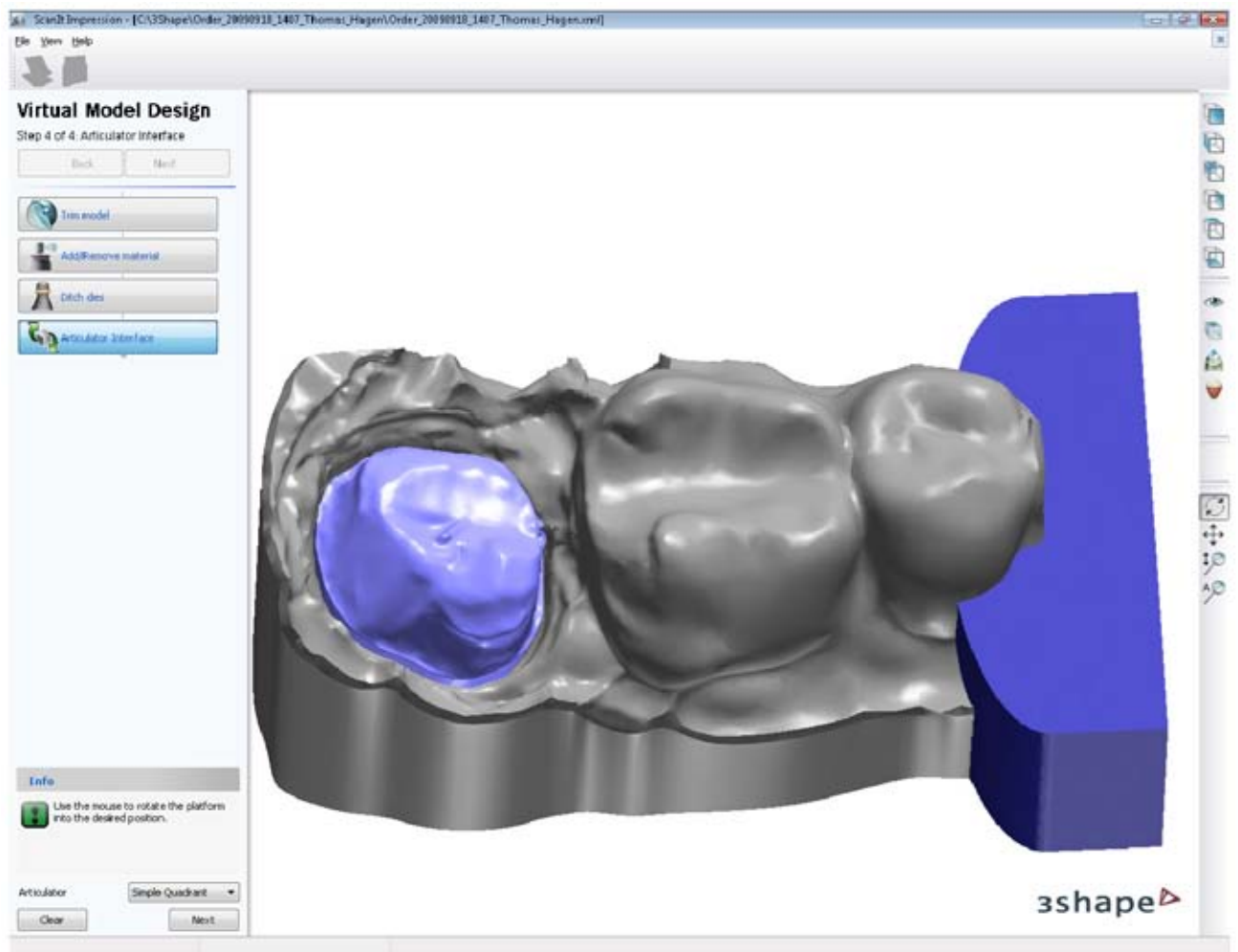


The **Removal radius** is the radius of the (virtual) burr used to remove gingival tissue from the surrounding model around the margin line.

Set the required insertion direction for the tooth with the virtual joystick as shown on the image below. You can also rotate the die with the cursor and press the **Set pin direction** button to redefine the current point-of-view as the insertion direction. Click **Next** to continue.

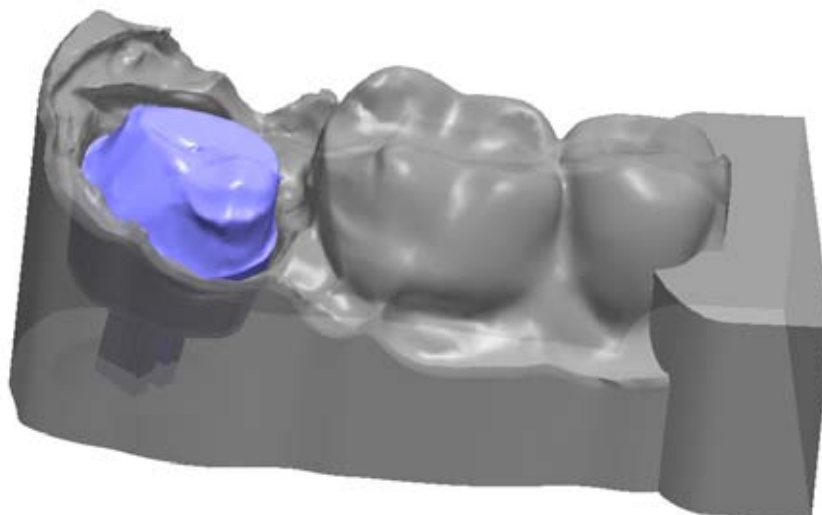


Adjust the position of the platform with the articulator interface. The position is changed by holding the mouse down over the blue articulator interface and dragging. The **Articulator** drop-down menu allows you to select different articulator interfaces: *Simple Quadrant*, *Simple Full Arch* and *Base*. Click the **Next** button to continue.



The virtual model design is now complete and the model has been saved. The final models from the virtual model design are automatically saved in the order folder, in the "Virtual Trimming" subfolder.

If you would like to start the modeling process in DentalDesigner, click the **Design** button.



4.4.3 Antagonist: Single Tray

Scan settings	
Object type	Impression
Antagonist	Single tray
Face Scan	None

Before scanning an impression with the antagonist define your order in the Order form. Select *Impression* as an object type and *Single tray* for the antagonist. Click **OK** to save your order which will appear in the DentalManager order list with the status *Created*.

You can also start ScanItImpression directly from the Order form by clicking the **Scan** button. Otherwise, select the created order from the DentalManager order list and start ScanItImpression by clicking **Next** or **Scan**.

Insert Impression with preparation side up	
Back	Next

When the program opens, insert the impression model into the scanner and click **Next** button to initiate the scanning process.

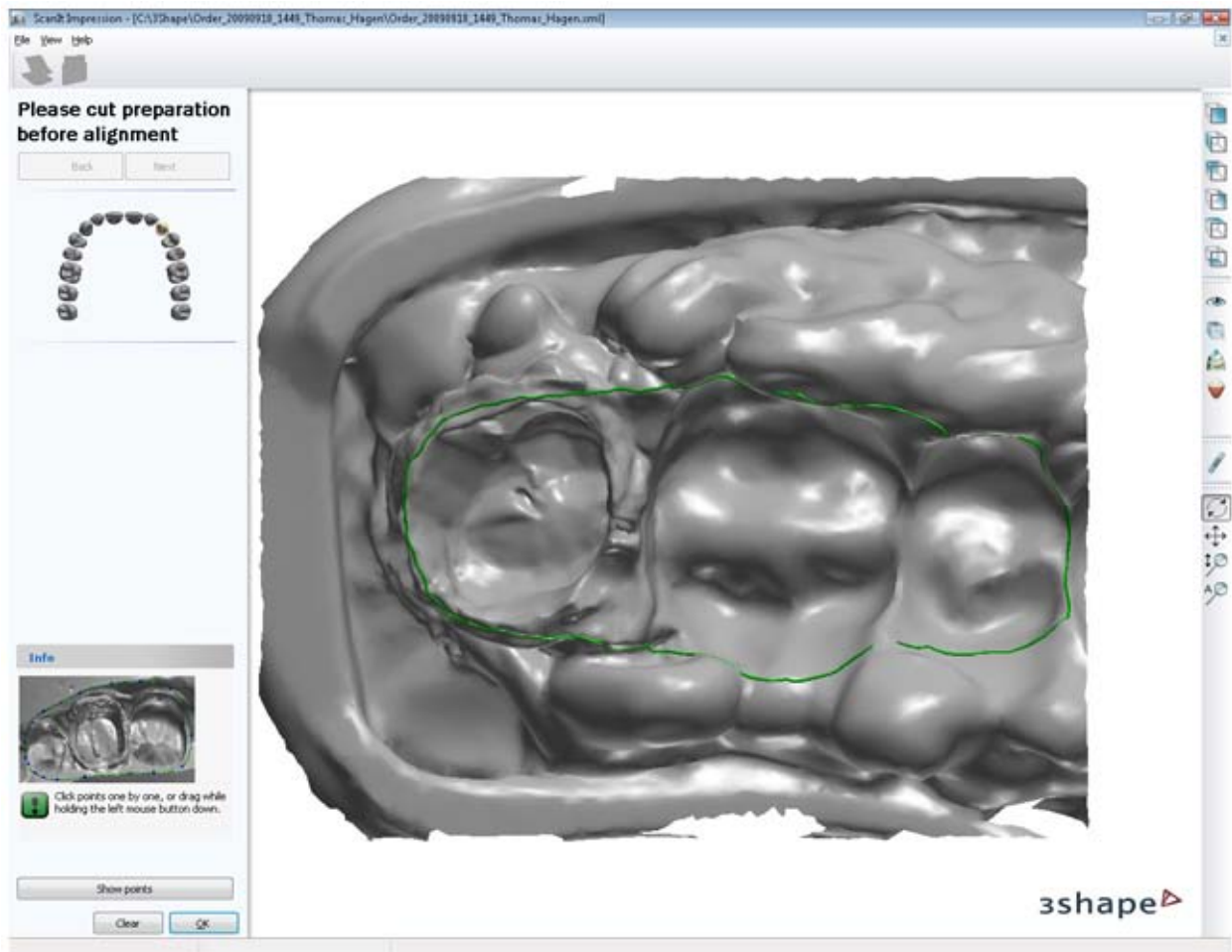
A fast overview scan is performed and appears on the screen shortly. The application asks you to mark the teeth included in your order. Select each preparation individually, and click **Continue** after each one.



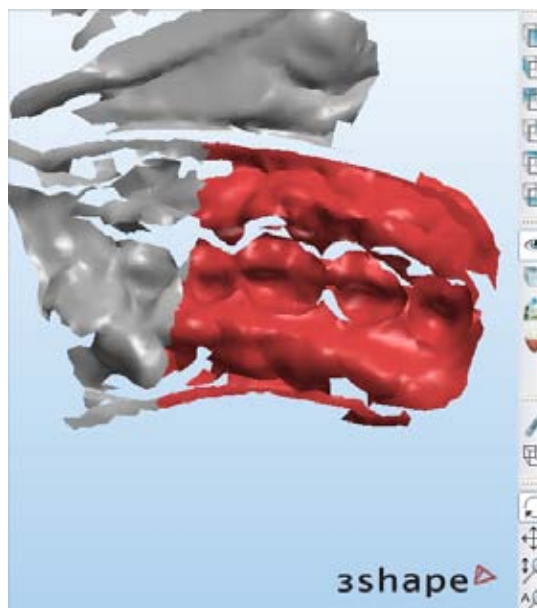
Next, you are prompted to mark the region of interest as shown on the image below. This is the region containing all preparations and any desired adjacent teeth. Click **Continue** when done.



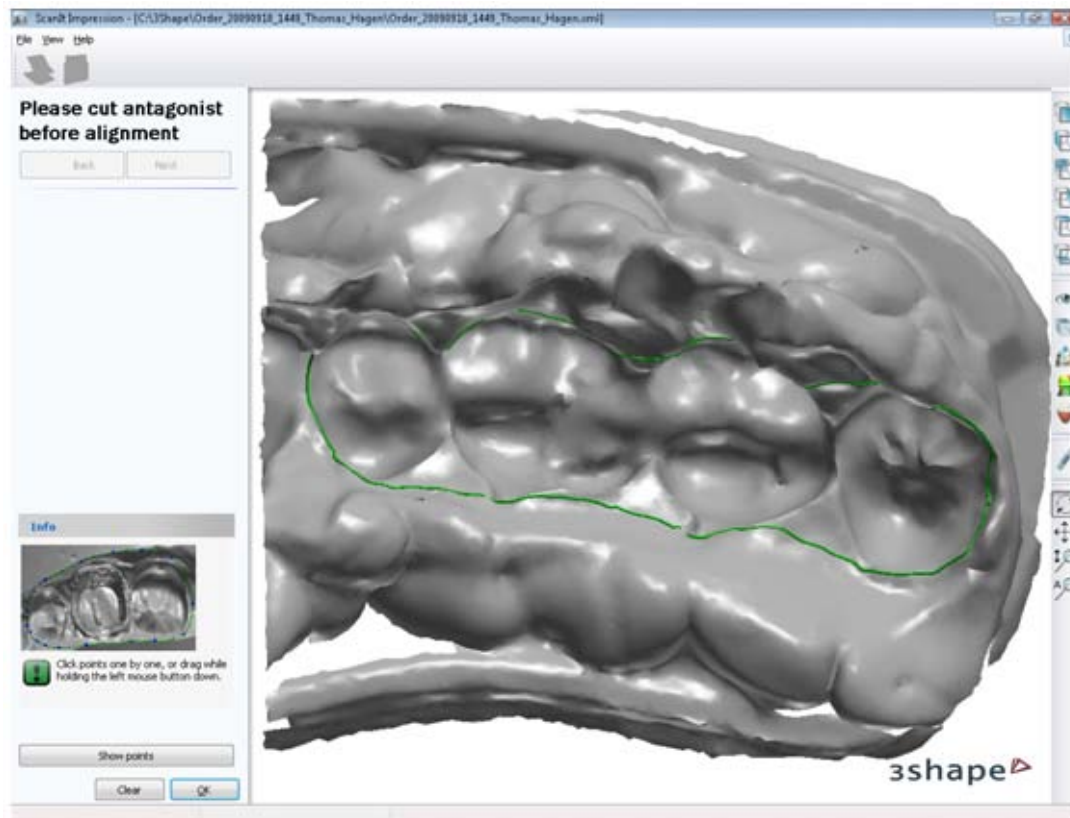
At the next step, draw a line to cut preparation before alignment. Click **OK** when done.



Then you are asked to insert the impression with antagonist side up, click **Next** to start scanning. Select the region of interest in antagonist and click **Continue**.

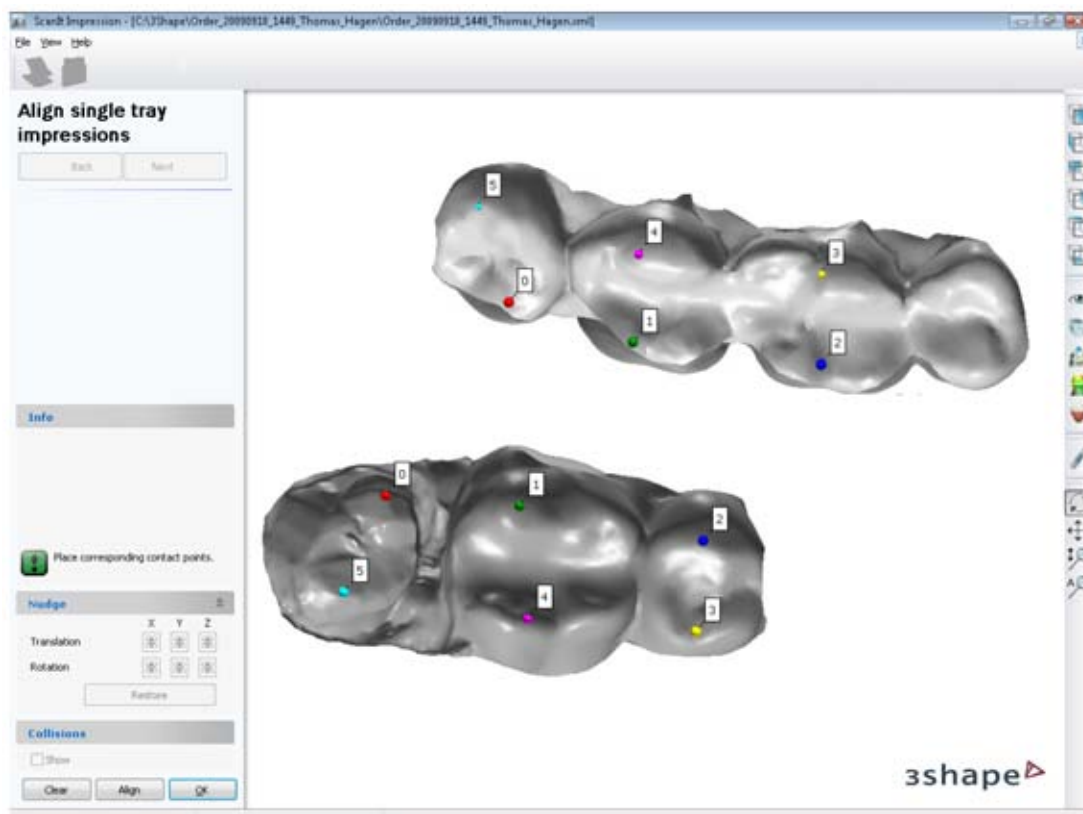


At the next step draw a line to cut antagonist before alignment.



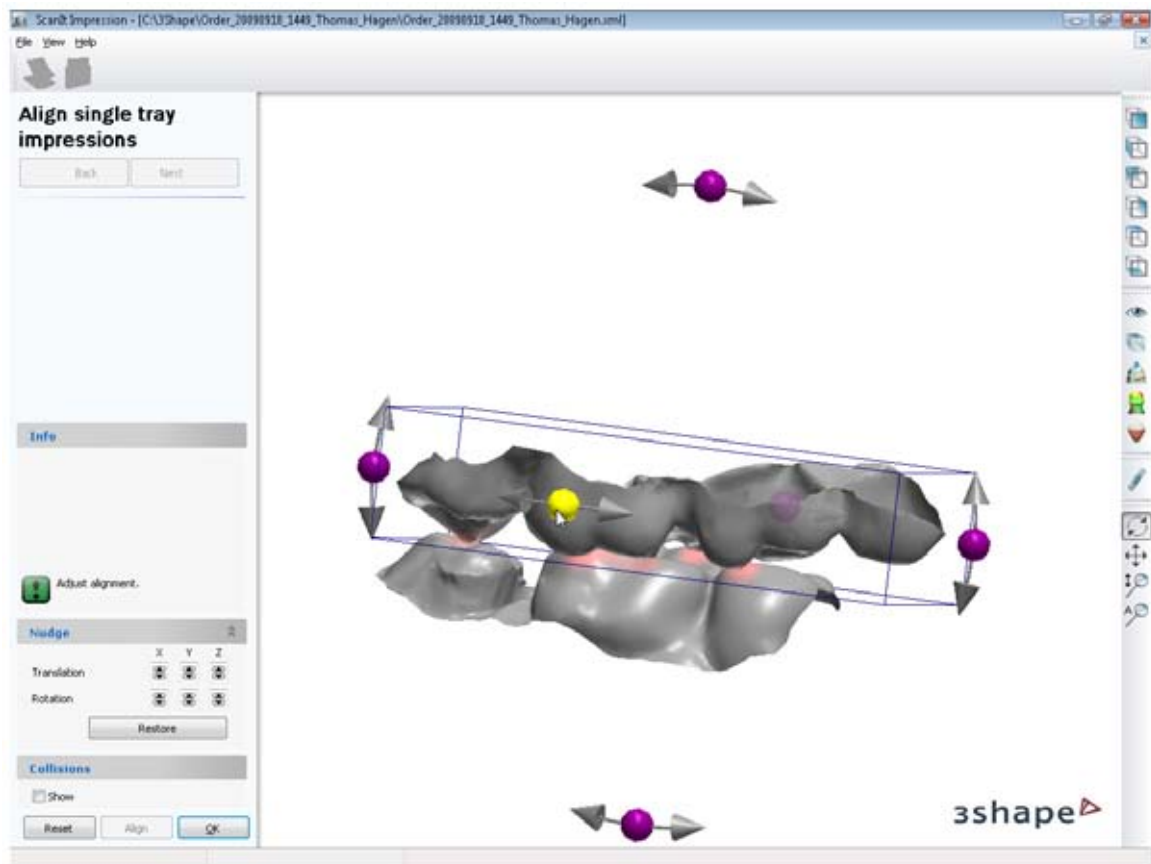
At the next step you should align the preparation with the antagonist by placing the corresponding points on both models in the places of their contact. For your convenience the colors and numbers of points on the preparation correspond to the colors and numbers of points on the antagonist.

You can place from 3 to 10 contact points on each model. Click **Align** to perform the alignment.

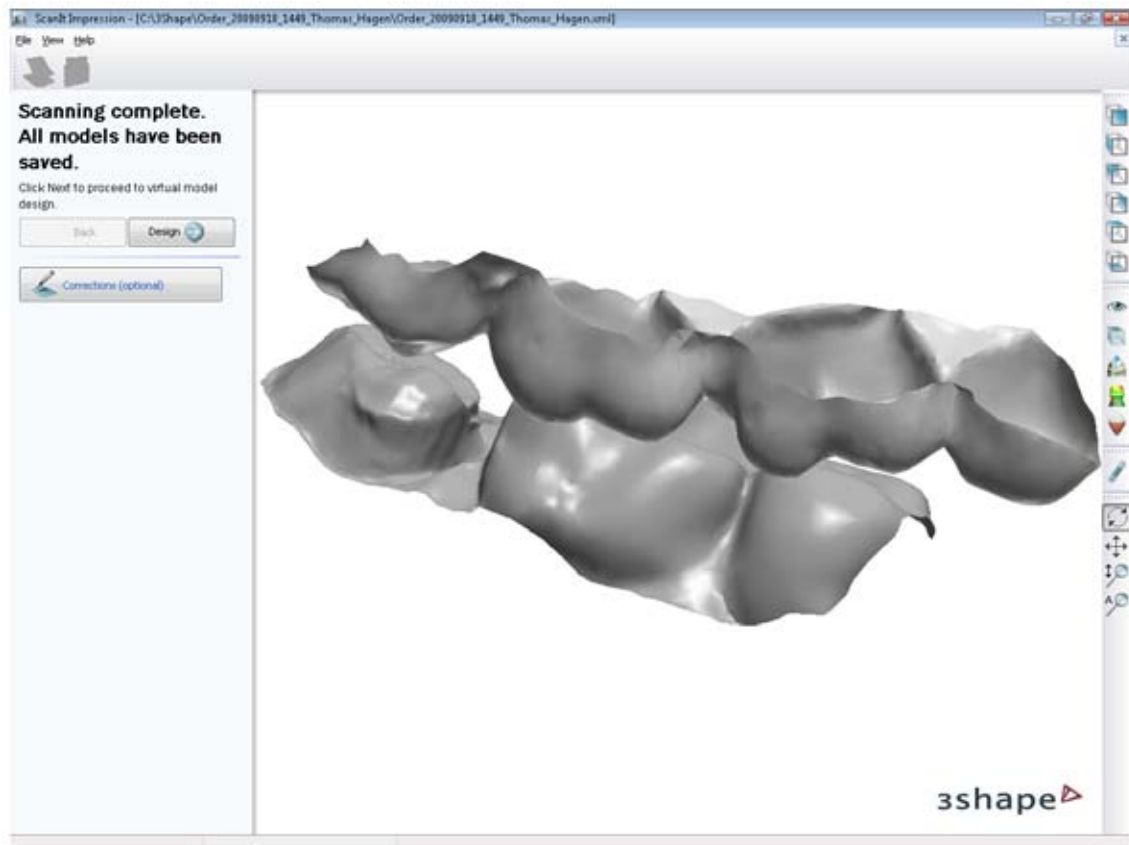


The antagonist can be translated and rotated with the buttons on the **Nudge** toolbar or with the trans box rotation points as shown on the image below. Possible collisions can be indicated when the **Show** check-box is selected.

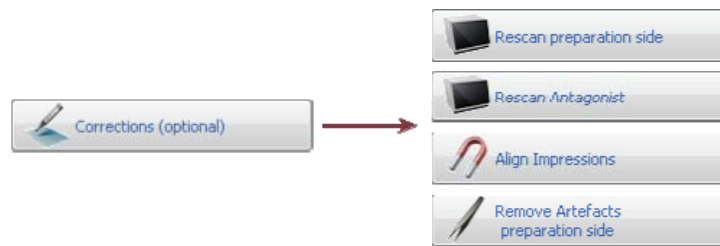
If you are not satisfied with the results of your manual trans box rotations, click **Restore** and the program will cancel the changes. Click **OK** when finished.



On completion of the alignment process all models become saved and you can do optional corrections if needed.



When clicked, the **Corrections (optional)** button expands to:



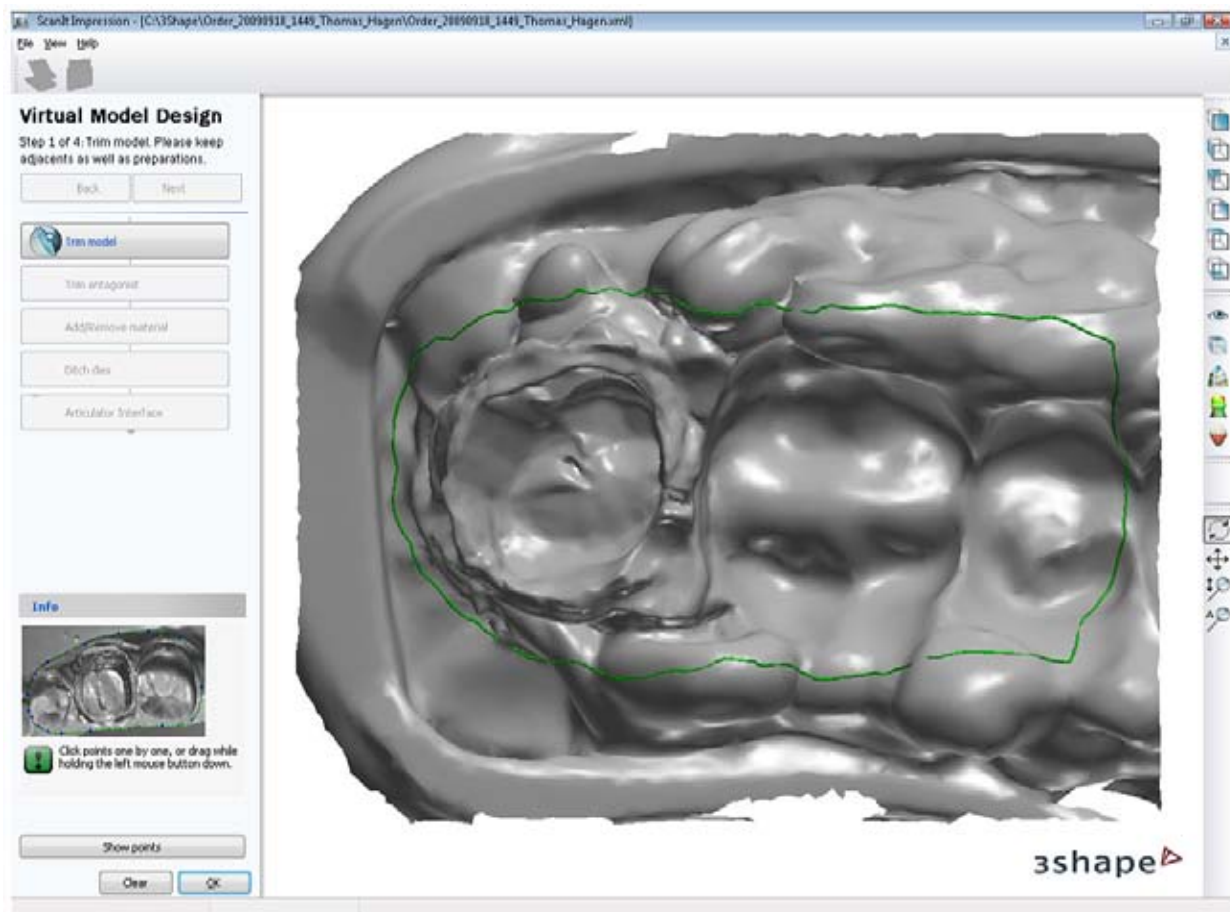
Click **Next** to go to the *Virtual Model Design* step and do trimming to the model and antagonist.

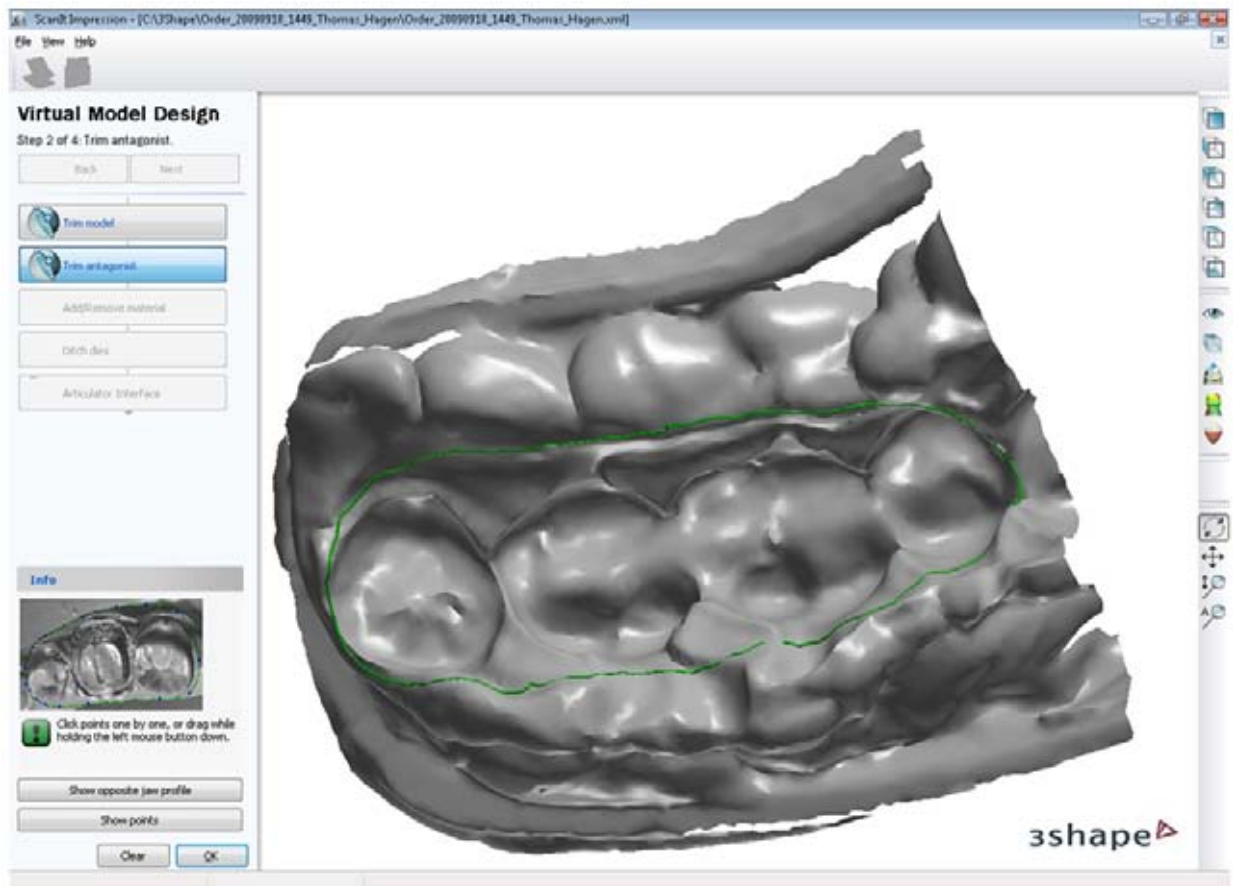
4.4.4 Virtual Model Design

Once trimming of the model and antagonist has been performed, click **OK** to continue.



Note! Make sure you include the adjacent teeth to the selection region.



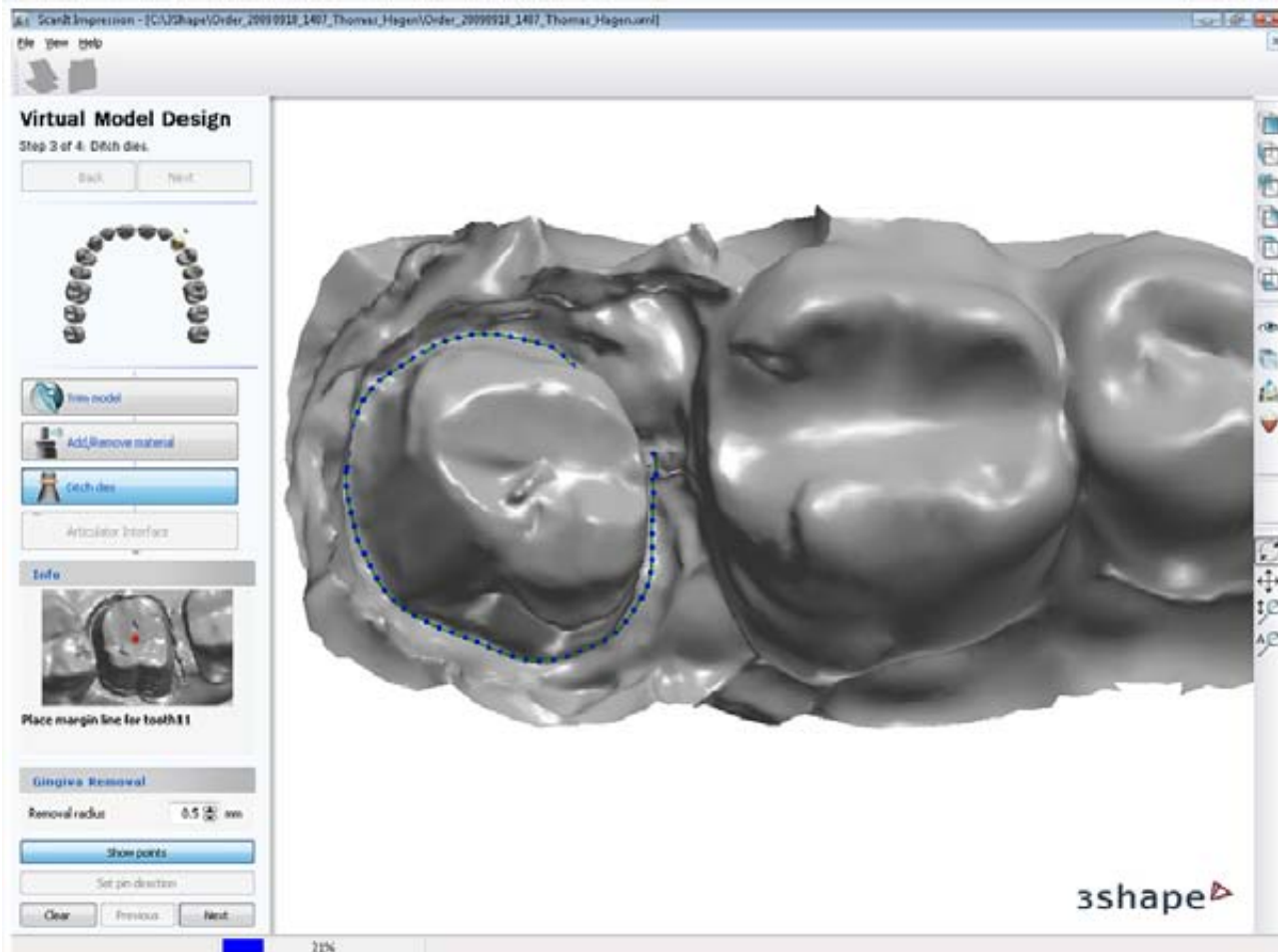


The *Add/Remove material* stage is an optional stage that can be used to modify the impression (e.g. to correct flaws in the preparation or remove gum tissue).

The next virtual modeling operation is to ditch the dies. A margin line must be defined for each preparation. Click a point on the top of the displayed tooth: the software will then automatically find a margin (which can be edited as usual). Alternatively, the margin can be drawn by dragging the mouse. Click **Next** to continue.



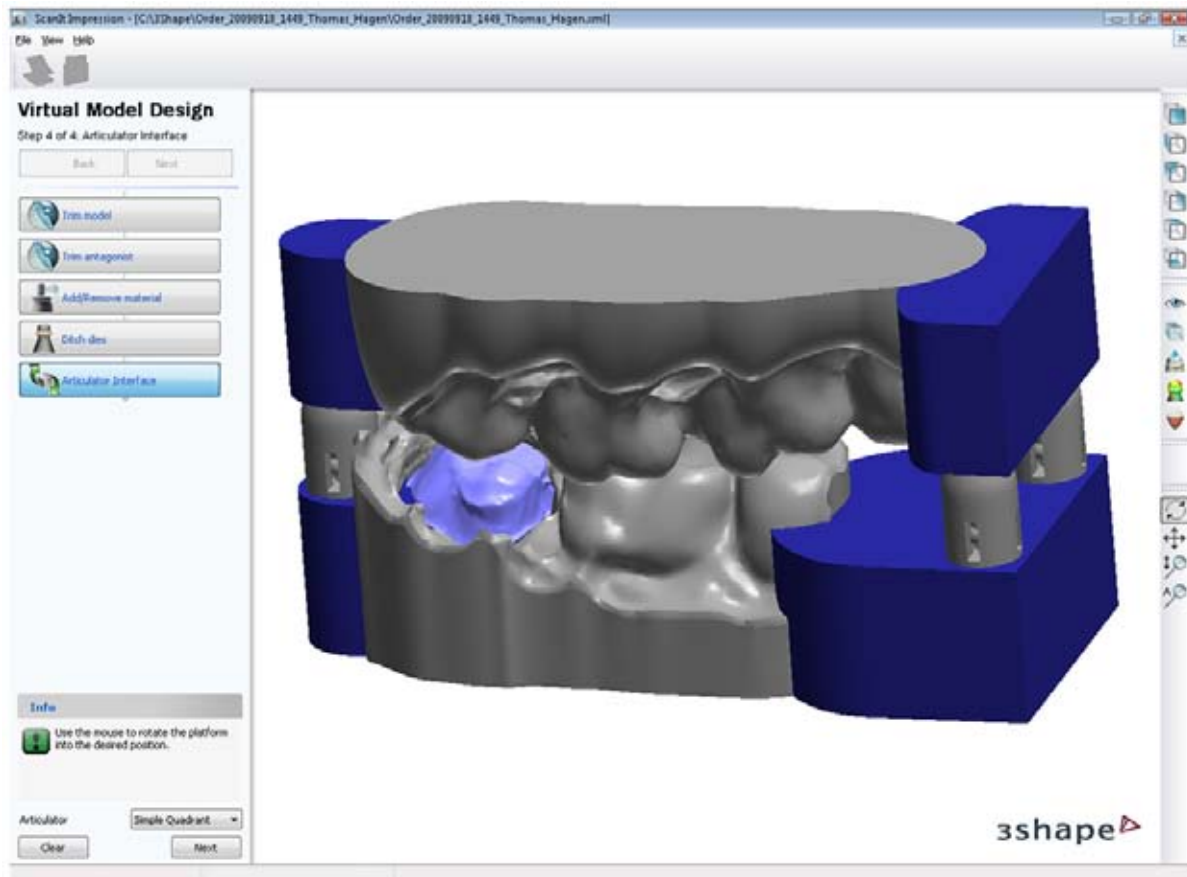
Note! 3Shape highly recommends that the dentist prepares using an exposed margin.



The **Removal radius** is the radius of the (virtual) burr used to remove gingival tissue from the surrounding model around the margin line.

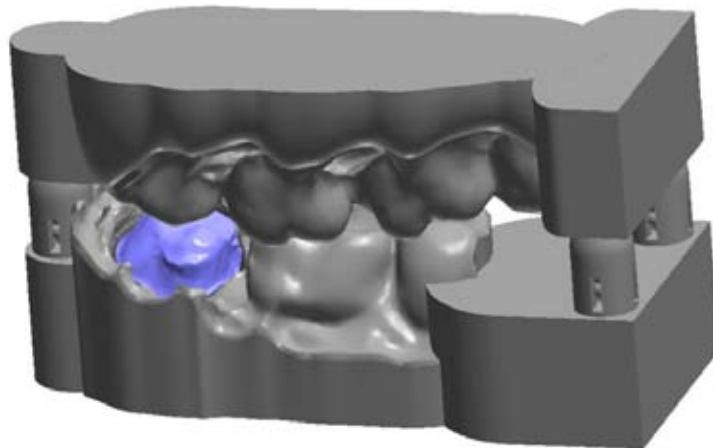
Set the required insertion direction for the tooth with the virtual joystick as shown on the image in the previous chapter Virtual Model Design. You can also rotate the die with the cursor and press the **Set pin direction** button to redefine the current point-of-view as the insertion direction. Click **Next** to continue.

Adjust the position of the platform of the articulator interface. The position is changed by holding the mouse down over the blue articulator interface and dragging. The **Articulator** drop-down menu allows you to select different articulator interfaces: *Simple Quadrant*, *Simple Full Arch* and *Base*. Click the **Next** button to continue.



The virtual model design is now complete and the model has been saved. The final models from the virtual model design are automatically saved in the order folder, in the subfolder "Virtual Trimming".

If you would like to start the modeling process in DentalDesigner, click the **Design** button.



4.4.5 Antagonist: Posterior/Anterior Triple Trays

Scan settings	
Object type	Impression
Antagonist	Posterior triple tray
Face Scan	None

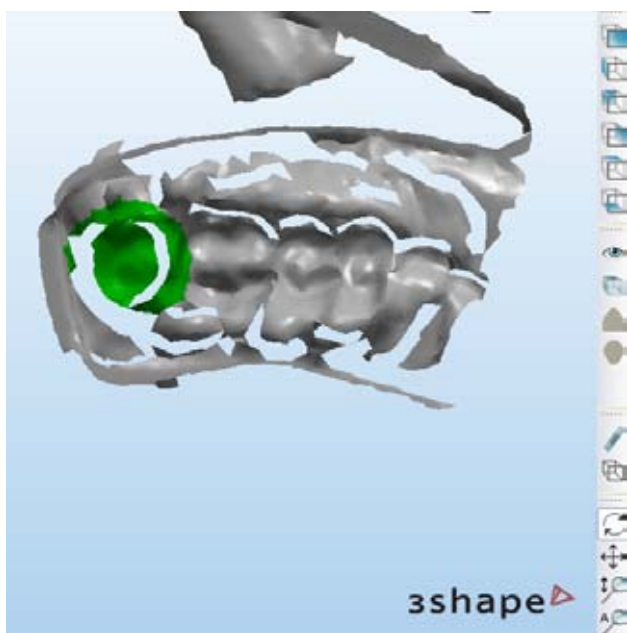
Before scanning an impression with the antagonist define your order in the Order form. Select *Impression* as an object type and *Posterior* or *Anterior triple tray* for the antagonist. Click **OK** to save your order which will appear in the DentalManager order list with the status *Created*.

You can also start ScanItImpression directly from the Order form by clicking the **Scan** button. Otherwise, select the created order from the DentalManager order list and start ScanItImpression by clicking **Next** or **Scan**.

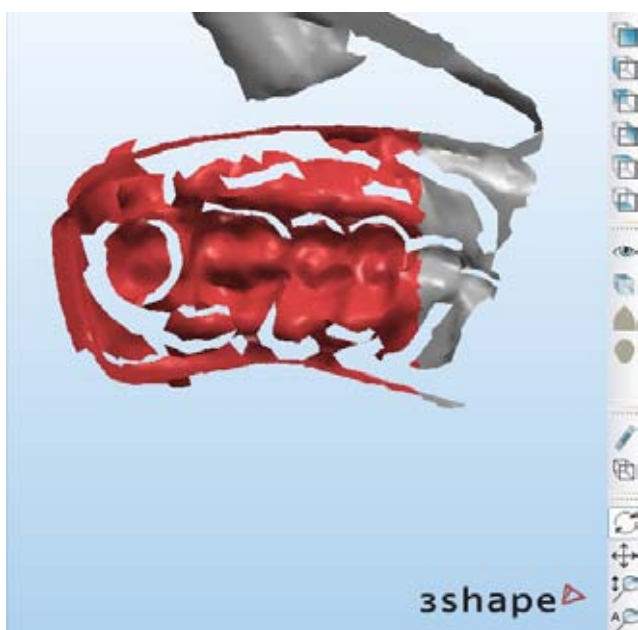
Insert Impression with preparation side up

Back	Next
------	------

When the program opens, insert the impression model into the scanner and click **Next** button to initiate the scanning process.

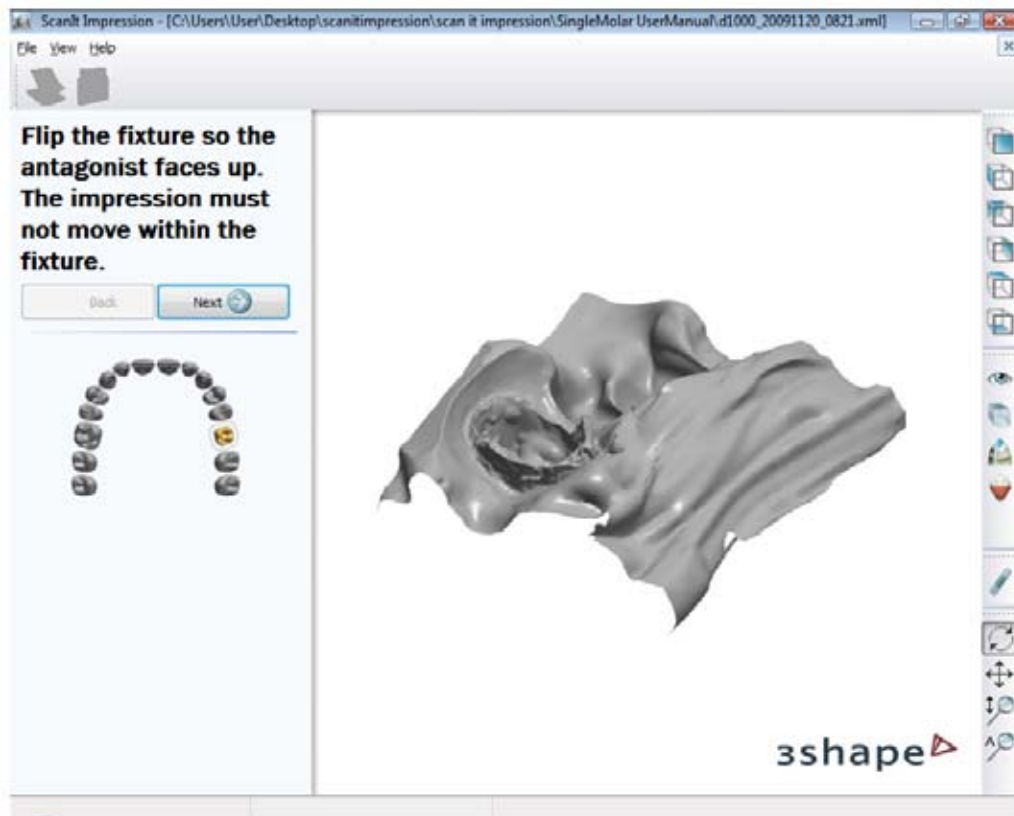


A fast overview scan is performed and appears on the screen shortly. The application asks you to mark the teeth included in your order. Select each preparation individually, and click **Continue** after each one.

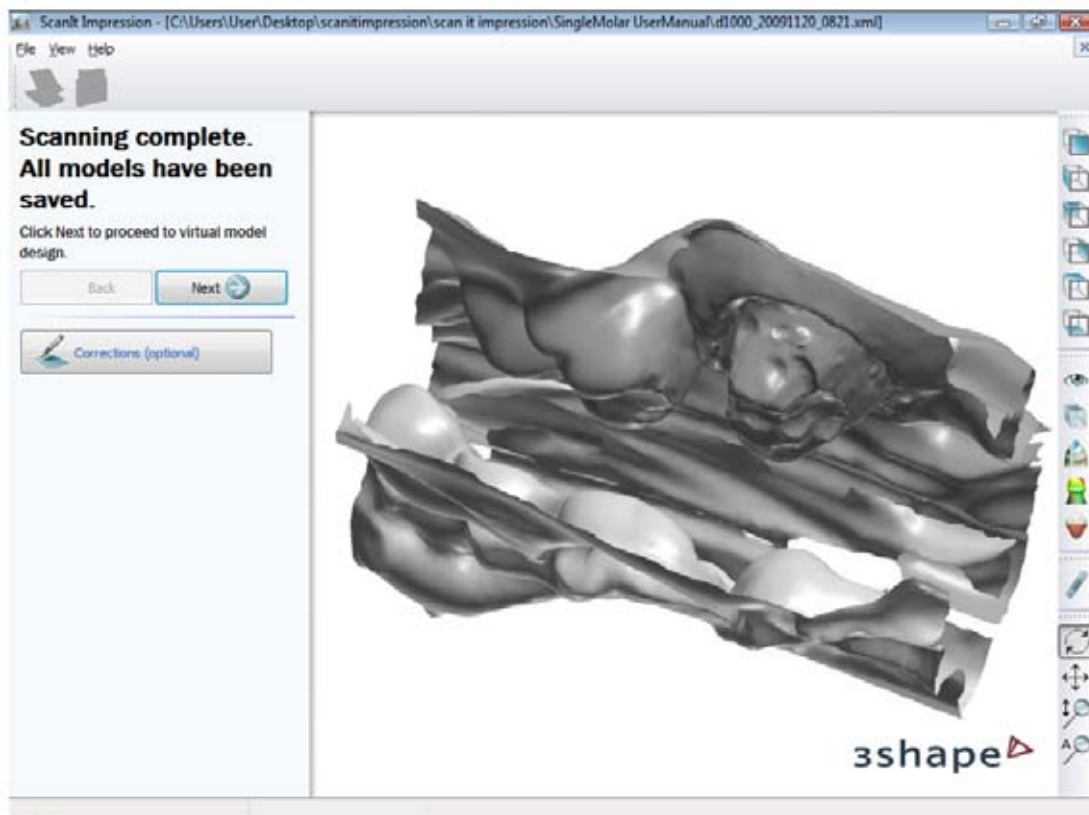


Next, you are prompted to mark the region of interest as shown on the image below. This is the region containing all preparations and any desired adjacent teeth. Click Continue when done.

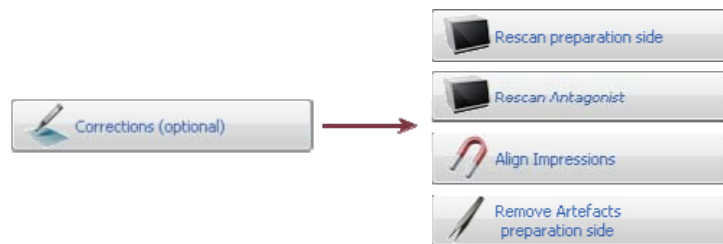
You will be asked to flip the fixture with the antagonist facing up. Be careful not to move the impression within the fixture.



On completion of the automatic alignment process all models become saved and you can do optional corrections if needed.



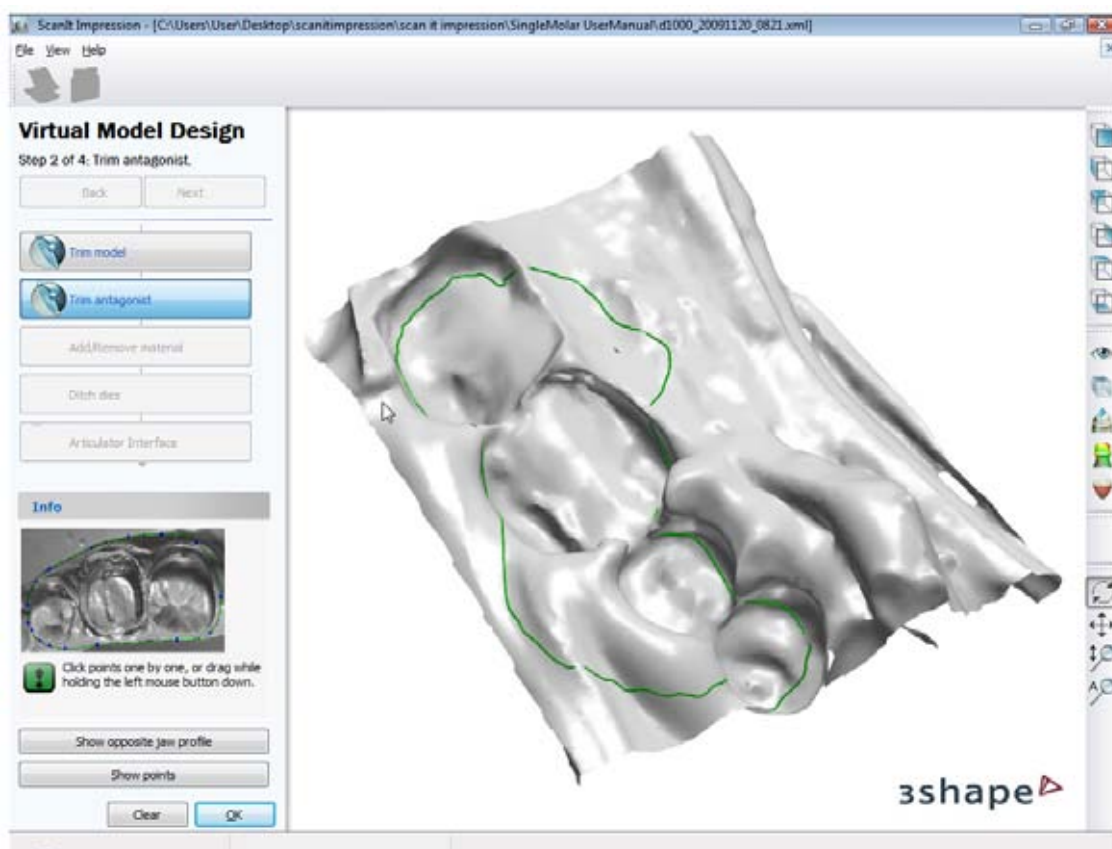
When clicked, the **Corrections (optional)** button expands to:



Click **Next** to go to the **Virtual Model Design** step and do trimming to the model and antagonist.

4.4.6 Virtual Model Design

Once the trimming of the model and antagonist has been performed, click **OK** to continue.



The *Add/Remove material* stage is an optional stage that can be used to modify the impression (e.g. correct flaws in the preparation or remove gum tissue).

The next virtual modeling operation is to ditch the dies. A margin line must be defined for each preparation (please see the previous chapter Virtual Model Design). Click a point on the top of the displayed tooth: the software will then automatically find a margin (which can be edited as usual). Alternatively, the margin can be drawn by dragging the mouse.

Click **Next** to continue.

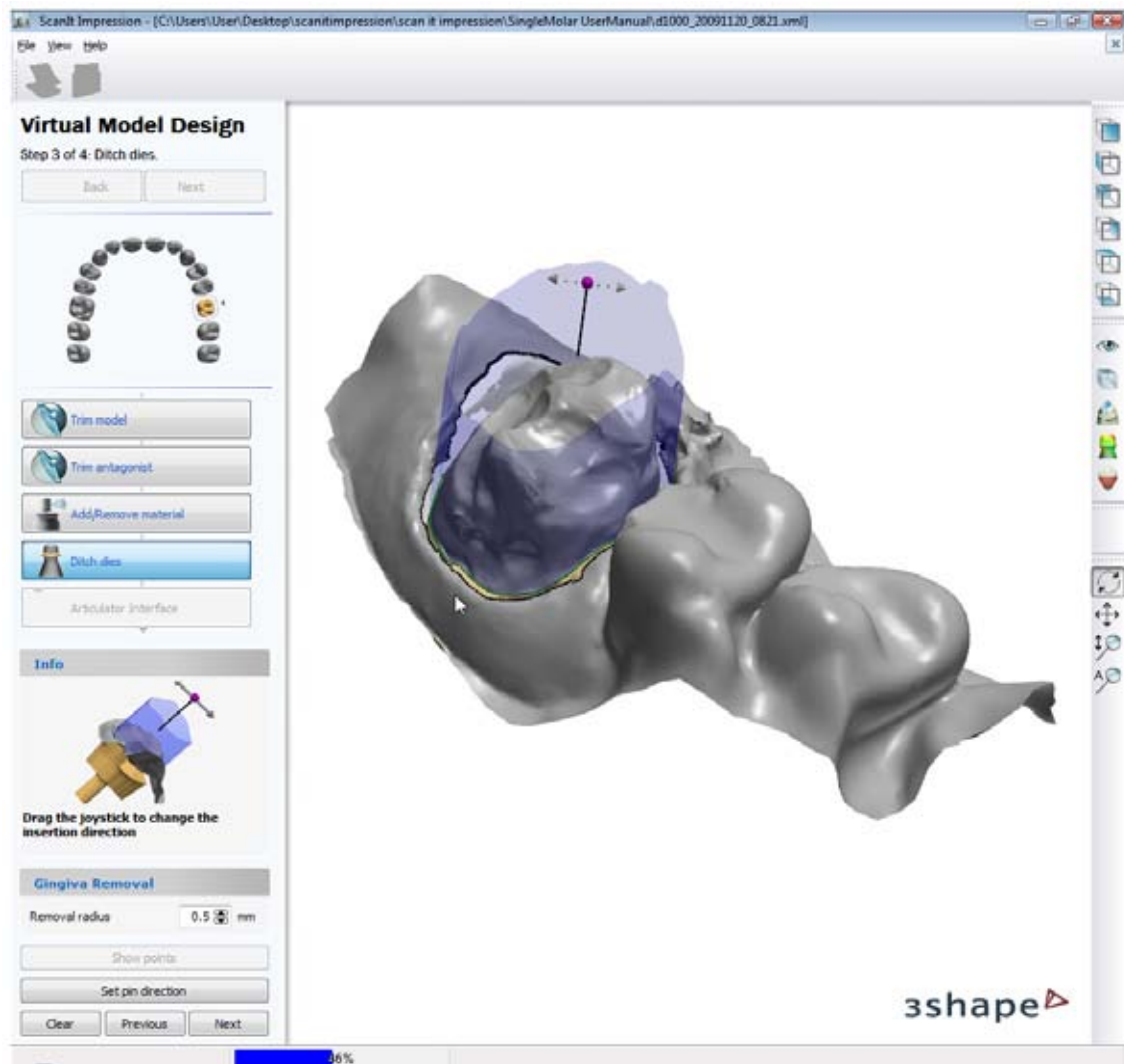


Note! 3Shape highly recommends that the dentist prepares using an exposed margin.

The **Removal radius** is the radius of the (virtual) burr used to remove gingival tissue from the surrounding model around the margin line.

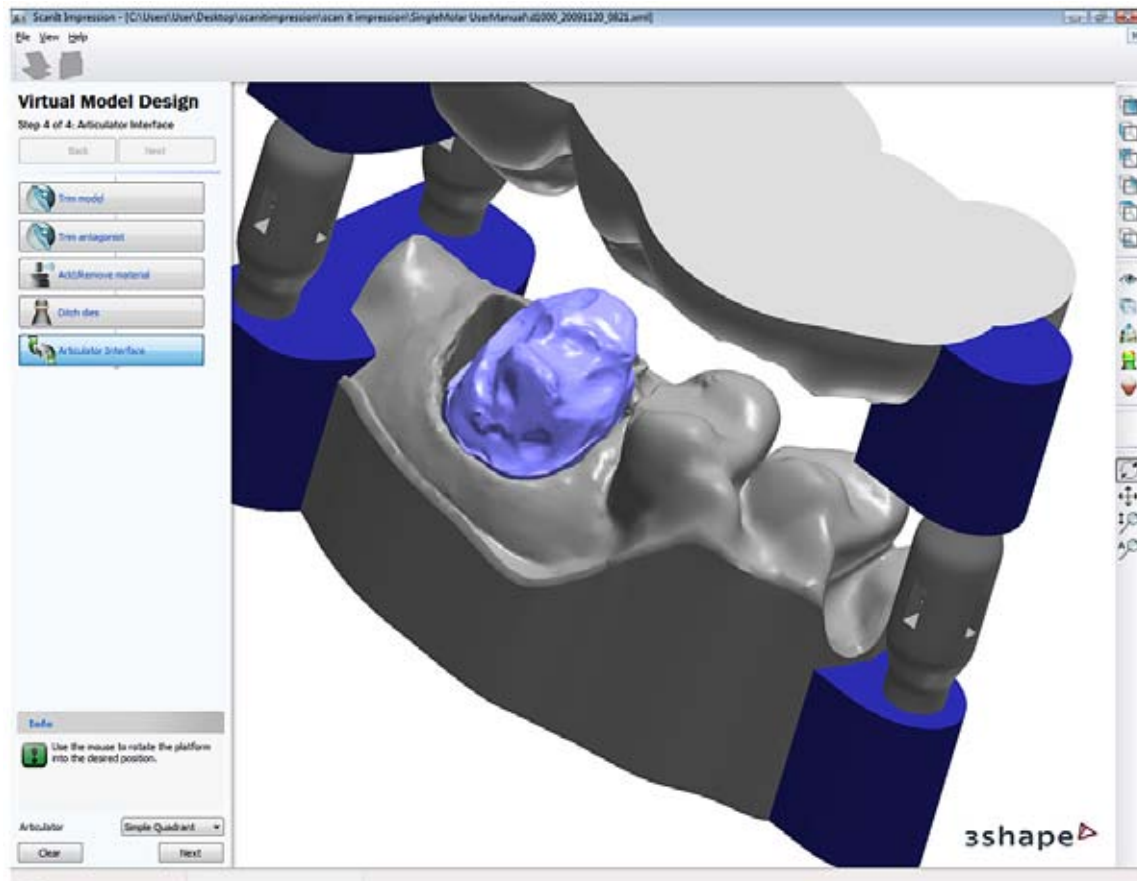
Set the required insertion direction for the tooth with the virtual joystick as shown on the image below. You can also rotate the die with the cursor and press the **Set pin direction** button to redefine the current point-of-view as the insertion direction.

Click **Next** to continue.



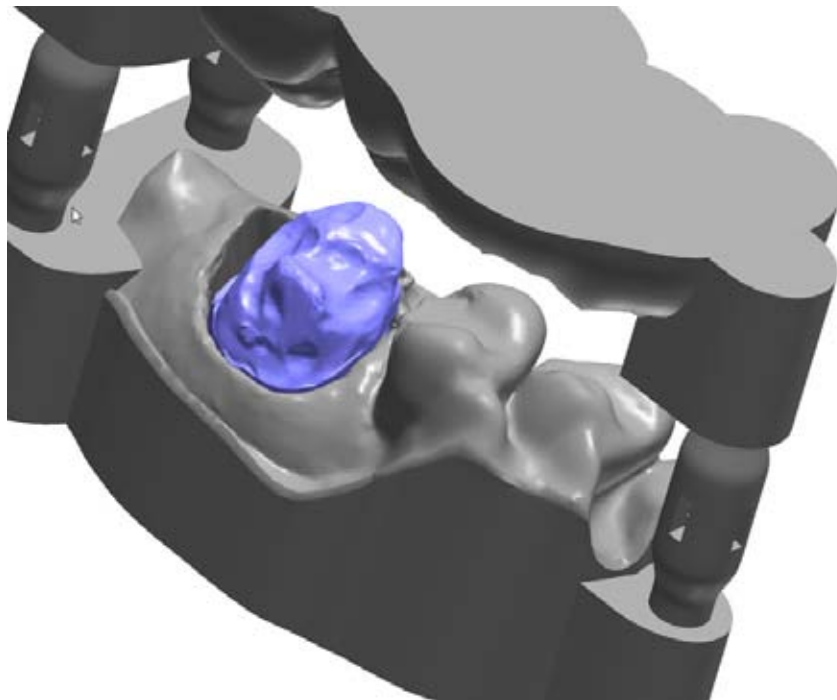
Adjust the position of the platform with the articulator interface. The position is changed by holding the mouse down over the blue articulator interface and dragging. The **Articulator** drop-down menu allows you to select different articulator interfaces: *Simple Quadrant*, *Simple Full Arch* and *Base*.

Click the **Next** button to continue.



The virtual model design is now complete and the model has been saved. The final models from the virtual model design are automatically saved in the order folder, in the subfolder "Virtual Trimming".

If you would like to start the modeling process in DentalDesigner, click the **Design** button.



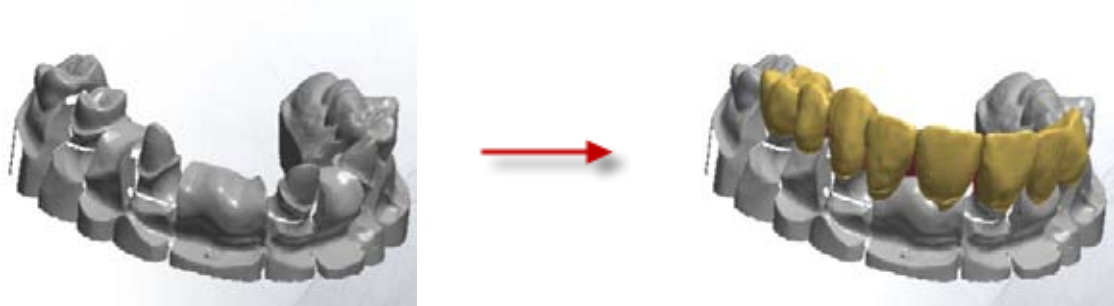
4.4.7 Post & Core Scans

The D700 scanner's impression scanning capabilities enable the scanning of post & core, something which is impossible on traditional gypsum scanners due to the narrow core. The scanning of post & core is identical to the standard impression scanning.

5 Modeling – DentalDesigner

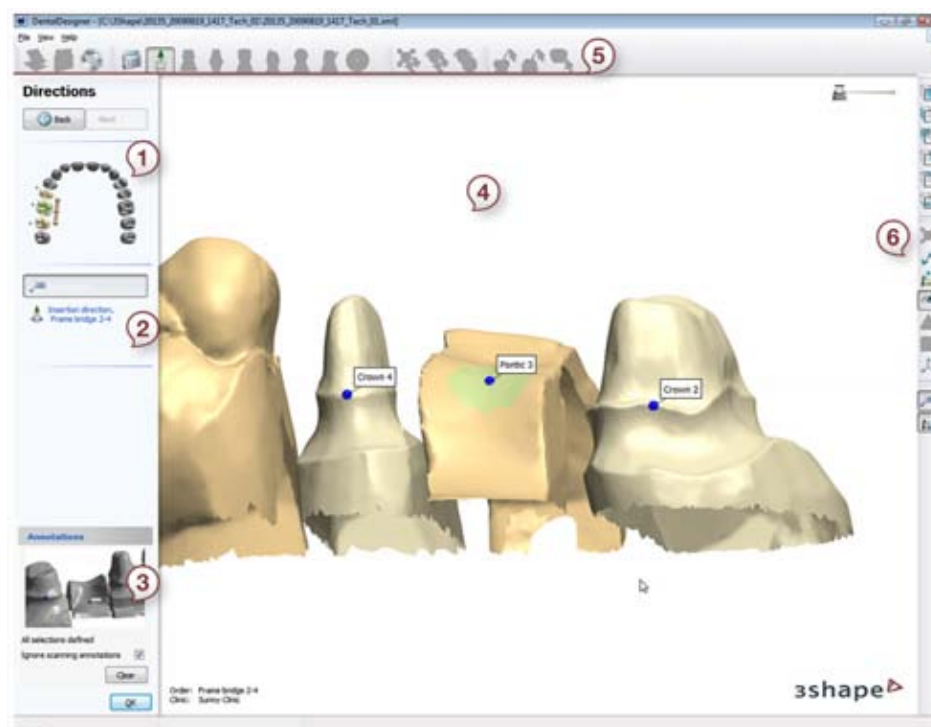
DentalDesigner™ is an advanced software package for designing high-precision, customized restorations from 3D scans of dental impressions. Using the latest technologies, the DentalDesigner™ software facilitates fast and easy 89odeling of complex constructions as well as enabling automatic manufacturing of the final restoration model on computer aided production equipment.

DentalDesigner launches after you have placed an order in DentalManager, scanned it and clicked **Model**. The image on the left illustrates the scan file that goes into DentalDesigner for modeling; and the image on the right shows the output model ready for manufacturing.



5.1 User Interface

After you have sent your order for modeling, DentalDesigner starts up and the main window similar to the image below appears on the screen. DentalDesigner user interface comprises the following toolbars: Your order is displayed in the **Modelling** window where you are able to view and model your order throughout the whole process.



1. Overview toolbar
2. Process toolbar
3. Tool forms
4. Modeling window
5. Main toolbar
6. Visualization toolbar



















5.1.1 Toolbars

This section contains detailed information on the toolbars with DentalDesigner interface:

- Main Toolbar
- Visualization Toolbar
- Overview Toolbar
- Process Toolbar
- Tool Forms

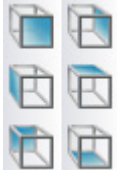









5.1.1.1 Main Toolbar

The Main Toolbar contains some of the major functions for performing the modelling process. The table below briefly describes the name and functionality of every button of this toolbar:

	New modelling - starts a new modelling session (note that this button is not used when started from DentalManager)
	Open modelling - loads a previously created modelling session from file (note that this button is not used when started from DentalManager)
	Save modelling - saves the current modelling session to a file
	Order - brings you to the step where the order form can be accessed
	Directions - brings you to the step for defining insertion direction
	Interfaces - brings you to the step where the margin line and die interface are defined
	Design abutments - brings you to the step of designing abutments
	Design telescopes - brings you to the step of designing telescopes
	Design anatomy - brings you to the step of designing anatomical elements of your restoration (e.g. crowns)
	Design frame - brings you to the step of designing framework of your restoration (e.g. copings)
	Finalize - verifies the complete restorations and add final touches
	Save - exports the completed restorations to input files for computer aided manufacturing facilities
	Reset all crown & pontic positions & bars - resets in the active layer crowns and pontics
	Reset all connectors - resets connectors in the active layer
	Auto update connectors - automatically updates connectors when bridge elements are edited
	Measure distance to adjacent - measures distance to the adjacent tooth/teeth
	Measure distance to preparation scan - measures distance to preparation scan
	Measure distance to antagonist scan - measures distance to antagonist scan

5.1.1.2 Visualization Toolbar

DentalDesigner comes with a set of tools and functions aimed to help you find the most advantageous visualization in different situations. The table below describes buttons of the Visualization Toolbar and their functionality:

	View – the view buttons allow you to switch between a number of predefined viewpoints
	Placement overview – enables you to control the alignment of crowns and pontics in a customized crown bridge
	Point dragging – changes the degree of spline point dragging for all features
	2D Cross section – provides the 2D cross section for a better model inspection. 2D cross sections can be specified either by placing three points on the 3D model or by dragging a section line by holding down the left mouse button and then moving the mouse over the model (please see section <i>2D Cross Section Window</i> for more information)
	Model Visibility – enables visualization of the necessary 3D model elements (see section <i>Model Visibility</i> for more information)
	Validation – evaluates the restoration according to the standard minimal values pre-set in Dental System Control Panel (or manually defined) and marks the areas that need correction
	Bounding box – outlines the borders of an active element of the restoration or the whole restoration
	Origin – assists orientation of the restoration model according to the standard three geometrical axes (x, y and z), which are independent of the user point-of-view
	Show annotations – displays annotations on the model
	Material shaders – marks the 3D model parts with the corresponding colors, imitating the surface of the real restoration materials

5.1.1.3 Overview Toolbar

The Overview Toolbar is designed to quickly provide information on the current job. It enables:



- An overview of the modelling jobs specified in the order form, as well as information on the currently active job highlighted with green dots.
- Information on job names and tooth numbering when you pause the mouse over the item.
- Activation and switching among jobs by left-clicking on the corresponding item.
- The visibility of scans and restorations by right-clicking on the corresponding item.

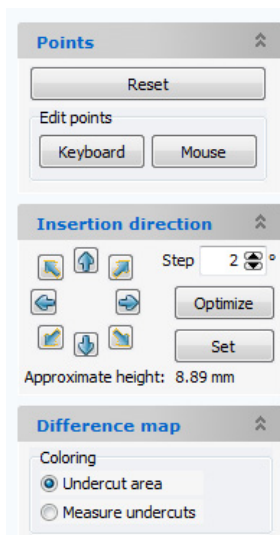
5.1.1.4 Process Toolbar



There are 6 main steps in the modeling process: **Order, Directions, Interfaces, Design, Finalize** and **Save** (please see chapter *Modeling steps* for more details). Each of these steps includes a number of specific actions, which are displayed in the Process Toolbar.

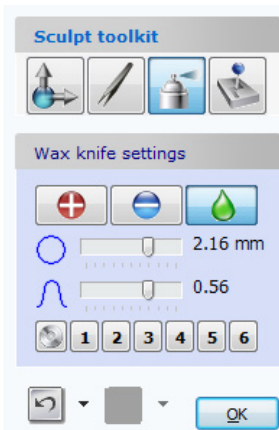
The image to the left shows an example of the **Directions** step. In this case the Process Toolbar reflects its two stages: **Annotations** and **Insertion direction**. If you go to the **Interfaces** step, for instance, **Remove artefacts, Margin line** and **Die interface** will be reflected in the **Process Toolbar** and so on.

5.1.1.5 Tool Forms



Each specific stage in the Process Toolbar has its sets of tools that become available when you click on the stage or it gets activated automatically. These tools are displayed in the Tool Forms in the left bottom part of the window.


For example, if you are at **Directions** step of the modelling process and working on the **Insertion Direction** of your model, a special window is displayed in the Tool Forms that helps you set a correct insertion direction (see image to the left).



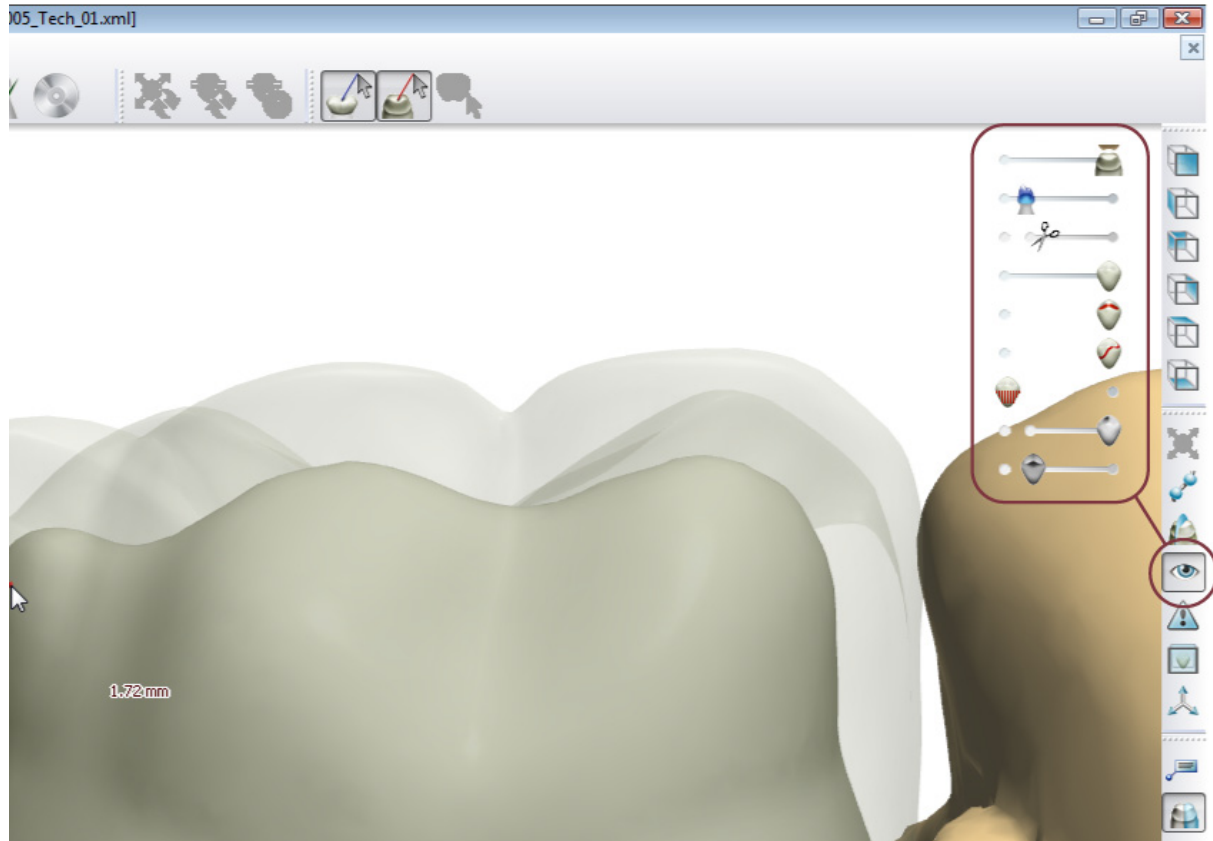
When you are, for instance, at the **Design frame** step, you can select the **Sculpt toolkit** to modify and transform your model as desired (see image to the right).

You will learn more about all these tools and toolbars from the next chapters during the modelling process.




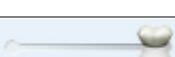
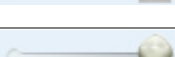
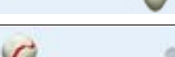
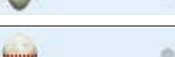


5.1.2 Model Visibility

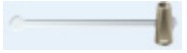





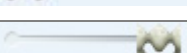
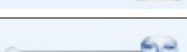
The **Model Visibility** slide bars appear in the upper right corner of the modelling window and you can enable/disable them by clicking the corresponding button  in the Visualization toolbar as shown on the image. These slide bars enable you to change the models translucency, they help you view the model and its parts from different angles, as well as displaying additional information such as collision lines. Depending on a model, a step within the modelling process and settings in the Order Form, the number and appearance of the **Model Visibility** slide bars can change. Some of the slide bars need to be activated by clicking on the dots located next to them (the dots become black when activated). To adjust visibility, left-click on the icon and drag it to the left or to the right.

The image below illustrates the 3-unit bridge at the **Design** step (you can see the **Model Visibility** slide bars in the right corner).












The table below describes most of the DentalDesigner **Model Visibility** slide bars:

	Preparation - makes the preparation scan more/less translucent
	Antagonist - makes the antagonist more/less translucent
	Cut neighbors - when active, cuts the neighbors of the model so you can see it from the sides when rotating
	Inactive items - makes the items that are not modelled at the moment more/less translucent
	Active item - makes the item that is modelled at this point more/less translucent
	Collision lines - shows the collision points of the model with neighbors and/or antagonist
	Undercuts - makes the undercuts more/less translucent
	Thickness map - provides the information in colors on thickness of the model
	Distance map - provides the information in colors on distance of the model to the antagonist and neighbors

	Scan Abutment - makes the scan abutment more/less translucent
	Implant - makes the implant more/less translucent
	Interface - makes the abutment interface more/less translucent
	Base - makes the abutment base more/less translucent
	Screw - makes the abutment screw more/less translucent
	Pre-preparation / Double preparation - makes pre-preparation and double preparation scans more/less translucent
	Wax-up bridge - makes the scan of a wax-up bridge more/less translucent
	Face scan - makes the face scan more/less translucent

5.2 Modeling Steps

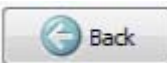

	1. Order
	2. Directions
	3. Interfaces
	4. Design:
	- Design Abutments
	- Design Telescopes
	- Design Anatomy
	- Design Frame
	5. Finalize
	6. Save

The DentaDesigner modelling process is split into **6 main steps**, as illustrated in the table to the left.

These steps are organized in the Main toolbar. When you complete one step, you are allowed to proceed to the next one or return to the previous step.

You can go to the next step by clicking the  button that

appears in the Tool Forms or the  button that appears in the Process toolbar.

Use the   buttons to go back and forth from one step to another.


To go to the next stage/step of the modelling process click **F6** - it works as both **OK** and **Next** buttons.

The following image illustrates the stage you are currently working on. You cannot proceed to the next step unless the previous one is completed.



5.2.1 Order Step



The **Order**  step is always available for you when you work on your model in DentalDesigner.

You can click on the **Order** button and select **Order form** to check out the Order that was created in DentalManager.



Note! This step is skipped when DentalDesigner opens order already defined in DentalManager.

Click **Next** to proceed to **Directions** step.

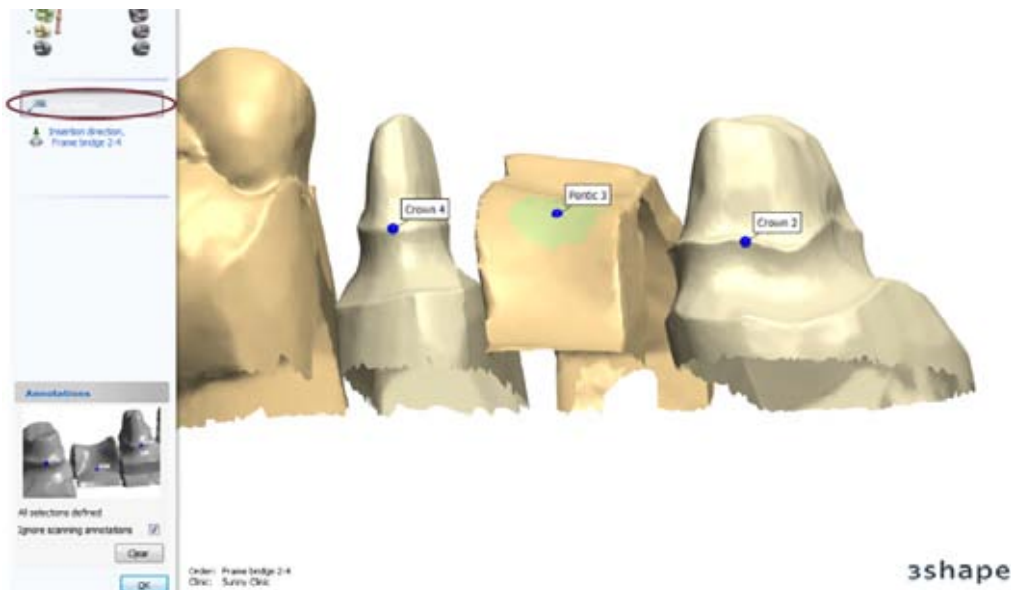
5.2.2 Design

5.2.2.1 Single Coping

ANNOTATIONS

The **Annotations** stage serves two purposes:

1. Specifying what part of the scan preparation corresponds to what restoration job. This specification is done with the help of blue control points located on each of the restoration items and white labels with job names and index numbers (see image below). Check the **Ignore scanning annotations** check-box to remove the labels and points that automatically appear on the scan after it is loaded (only needed if these have been misplaced during the scanning process).
2. Approximately identifying the margin line. DentalDesigner is equipped with a versatile semi-automatic margin recognition function. This means that you need to point the edge where the margin line approximately lies, and DentalDesigner algorithm will take care of finding the exact position of the margin line so you could modify it later. The action of indicating where the margin line lies is done by positioning the blue control point next to where the margin line is. If it's a pontic, there is no margin line there and you need to place the control point in the front central part of the stump as shown on the following image.



You can place and move the points with the mouse and click **Clear** to delete them.

Click **OK** to move to the **Insertion direction** stage (or **Telescope direction** if you're working on a telescope).

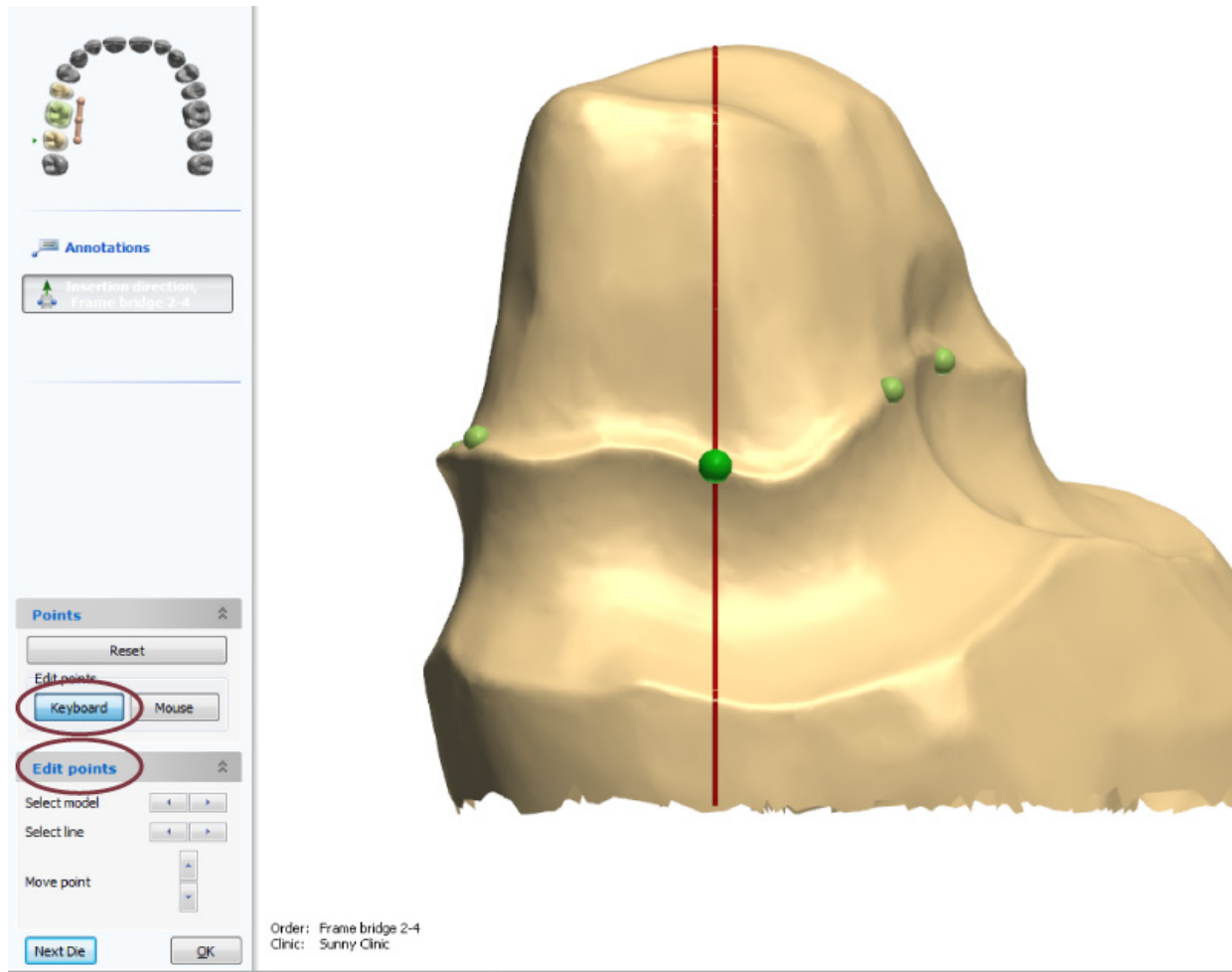
INSERTION DIRECTION

The **Insertion direction** stage comes next after **Annotations** or **Telescope Direction** and serves two purposes:

1. Defining the insertion direction, i.e. the direction according to which the restoration is inserted on top of the die.
2. Setting the margin line. The **Insertion Direction** stage provides only a rough estimate of the margin line, the actual margin line is defined at the *Margin line* stage. You are able to modify the margin line using keyboard, mouse or the **Edit points** tool displayed in the Tool Forms.

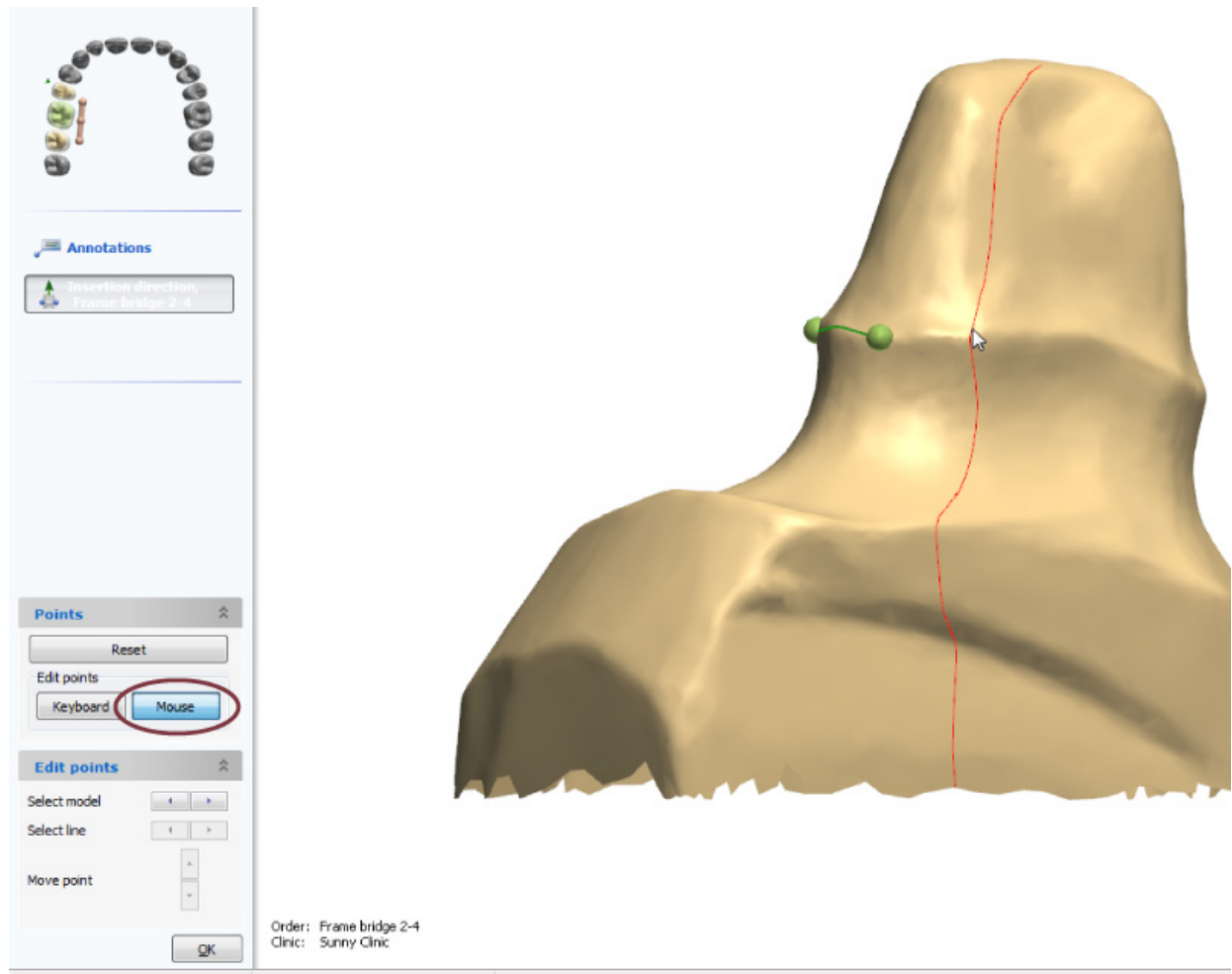
Using keyboard:

1. Select the **Keyboard** button.
2. Press the "RIGHT" and "LEFT" keys on the keyboard to change between points.
3. Press the "UP" and "DOWN" keys on the keyboard to move the points up and down (press **Ctrl+Shift** to make the points move faster).



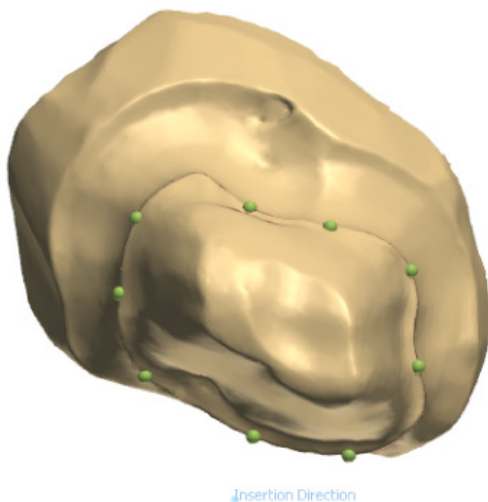
Using mouse:

1. Select the **Mouse** button.
2. Place a point on the die by pressing the left mouse button. The die will rotate so that the next point can be placed by pressing the left mouse button once again. A spline appears between the points during the placement. After you make a full circle and click on the first point the spline is automatically closed.



Using Edit points:

1. This tool is active when the **Keyboard** button is selected.
2. Click on the blue arrows to move from point to point and to move the points up and down.



Note! The green points only reflect an estimate of the margin line (hence they do not need to be placed exactly on the margin line). A detailed definition of this line is performed at *Interfaces* step of the modelling process.

When the points are positioned correctly on all items in the restoration, click **Done** and an optimization procedure will automatically provide an estimate of the insertion direction. The current restoration is rotated into a position proposing this direction as the user point-of-view, as visualized in the image on the left.

You can always rotate the die and press the **Set** button to redefine the current point-of-view as the insertion direction.

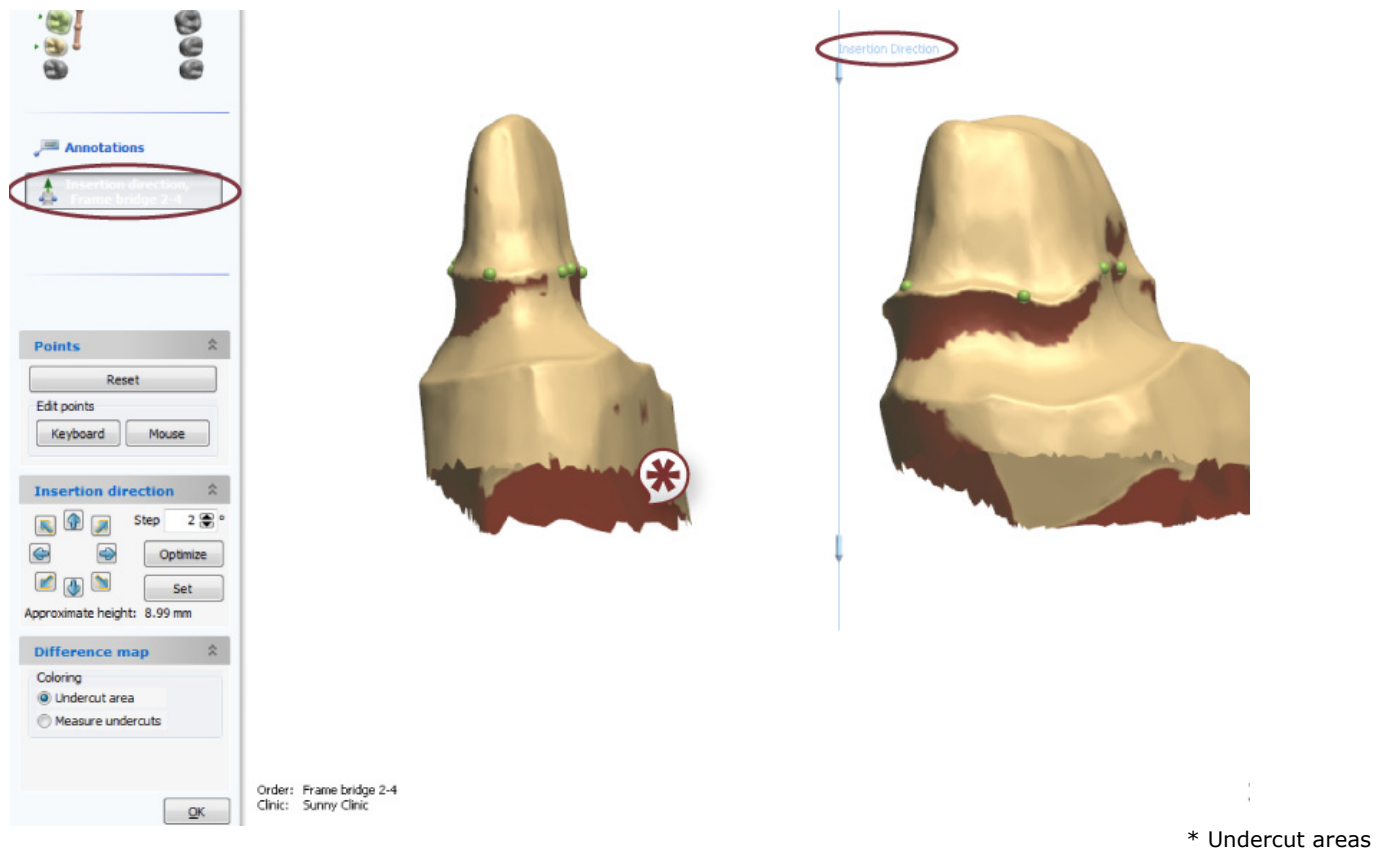
The direction can also be changed by clicking the blue arrows  in the Tool Forms. To increase or decrease the angle of direction positioning, set up the desired angle in the **Step** box by choosing the corresponding number and then click on arrows.

In addition, the optimization can always be calculated again by pressing the **Optimize** button.

Two blue arrows display the calculated insertion direction. The dark red shading indicates undercut areas for the given insertion direction (see image below).

Undercuts are areas that need compensation during the modelling process, and it is important that the area above the margin line is not part of the undercut area. The undercuts can be measured by selecting **Measure undercuts**, where the total undercut area as well as the depth of the undercuts is visualized.

Click **OK** to complete the process and move to the next step **Interfaces**.



MARGIN LINE

The aim of this stage is to define the exact margin line for the item being modelled. The margin lines are defined for all dies before moving to the **Die interface** stage. A well-defined margin line is essential for obtaining a good final fit and hence, this step is one of the most important steps in the entire modelling process. This step only marks the margin line. The actual cutting of the die is performed in the next modelling step.

A number of green points is automatically placed on the margin line of the model at the **Insertion direction** stage. The **Margin Line** stage then automatically places the red spline based on these points. The margin line is extracted based on the "red pencil" margin line approach which simulates the manual approach used by many technicians.



Note! It is recommended to visually inspect the automatically detected margin line, and if needed to modify it using the Fast edit functionality. By using the mouse cursor to draw (or simply click) on the model you can modify the margin line easily. As described below there are other ways of modifying or adding a margin line, but the Fast edit functionality is in general the preferred method.

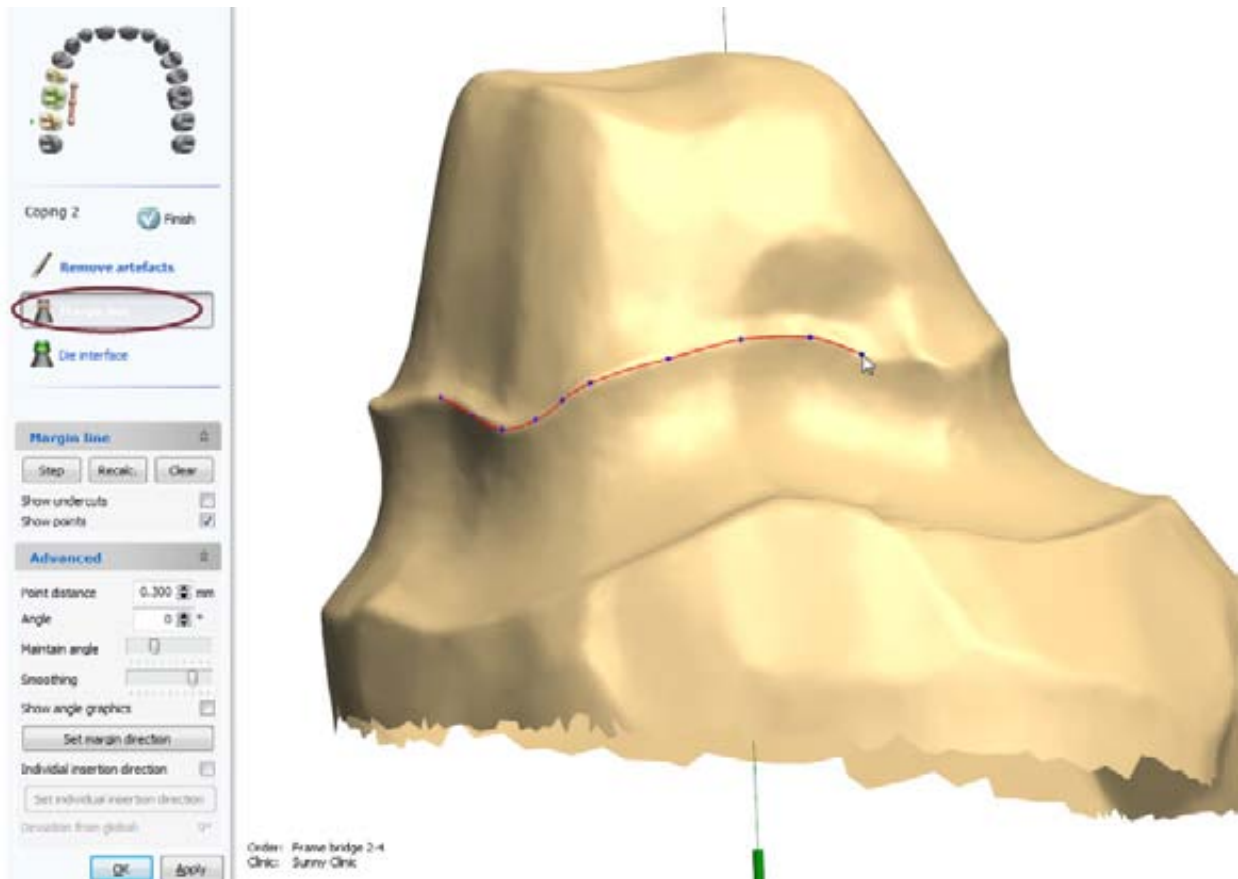
If for some reason the margin line can not be automatically placed, the program will ask you to place it manually.

Place the margin line by left-clicking on the model and placing the points until the full circle is formed. The points on the line can be visualized if you check the **Show points** check-box in the Tool Forms; to view the undercuts areas check **Show undercuts**. The points turn red (they are blue initially) when they are in the undercut areas to draw your attention to this potential problem.



Hint! Move the points out of undercut areas, since undercuts at the margin line may result in a bad fit.

Therefore, visualize the automatically extracted points in order to check if one or more points are in the undercut area.



The individual points can be moved either manually or using the **Step** button. When the **Step** button is pressed, the points on the spline can be moved using the keyboard:

- Press the RIGHT and LEFT arrow keys on the keyboard to change between the points (each point is displayed as a green ball placed on a red line) on the individual die.
- Press the UP and DOWN arrow keys on the keyboard to move the points up and down

If a point needs to be moved a long distance and faster, press **Ctrl** + UP/DOWN or **Shift** + UP/DOWN. When the points are moved using keyboard, the **2D Margin line** window appears for a precise positioning of the individual points in the margin line.

When the **Step** button is not pressed, you can move points with the mouse by clicking and dragging them. Right-click on a point and choose **Remove** to delete individual points and choose **Add** to create new points.

It is always possible to get a new estimate of the margin line by pressing the **Recalc.** button and to clear the spline by pressing the **Clear** button.

The **Point distance** box defines the distance between each point on the automatically extracted spline.

The **Angle** is the angular difference between the margin direction (see description below) and the angle used in the "red pencil" margin line algorithm.

The **Maintain angle** slide bar defines the importance of the **Angle** value. With a high value the angular difference described above is the important parameter in the margin line algorithm, while lower values result in the local curvature of the die being more important in the margin line algorithm. The **Smoothing** slide bar defines the amount of post-processing applied to the automatically extracted spline. The **Show angle graphics** checkbox enables or disables the advanced angle graphics.

The **Set margin direction** button defines the direction which best represents the current die and helps to place the more precise margin line. Margin direction is visualized with the help of green arrows, as shown in the image above.

The **Set individual insertion direction** button provides an alternative direction to the individual dies, which may be relevant for certain bridge orders.



Note! Please make sure that your manufacturing device supports individual insertion direction (usually RP machines or 5 axis milling machines are recommended here).

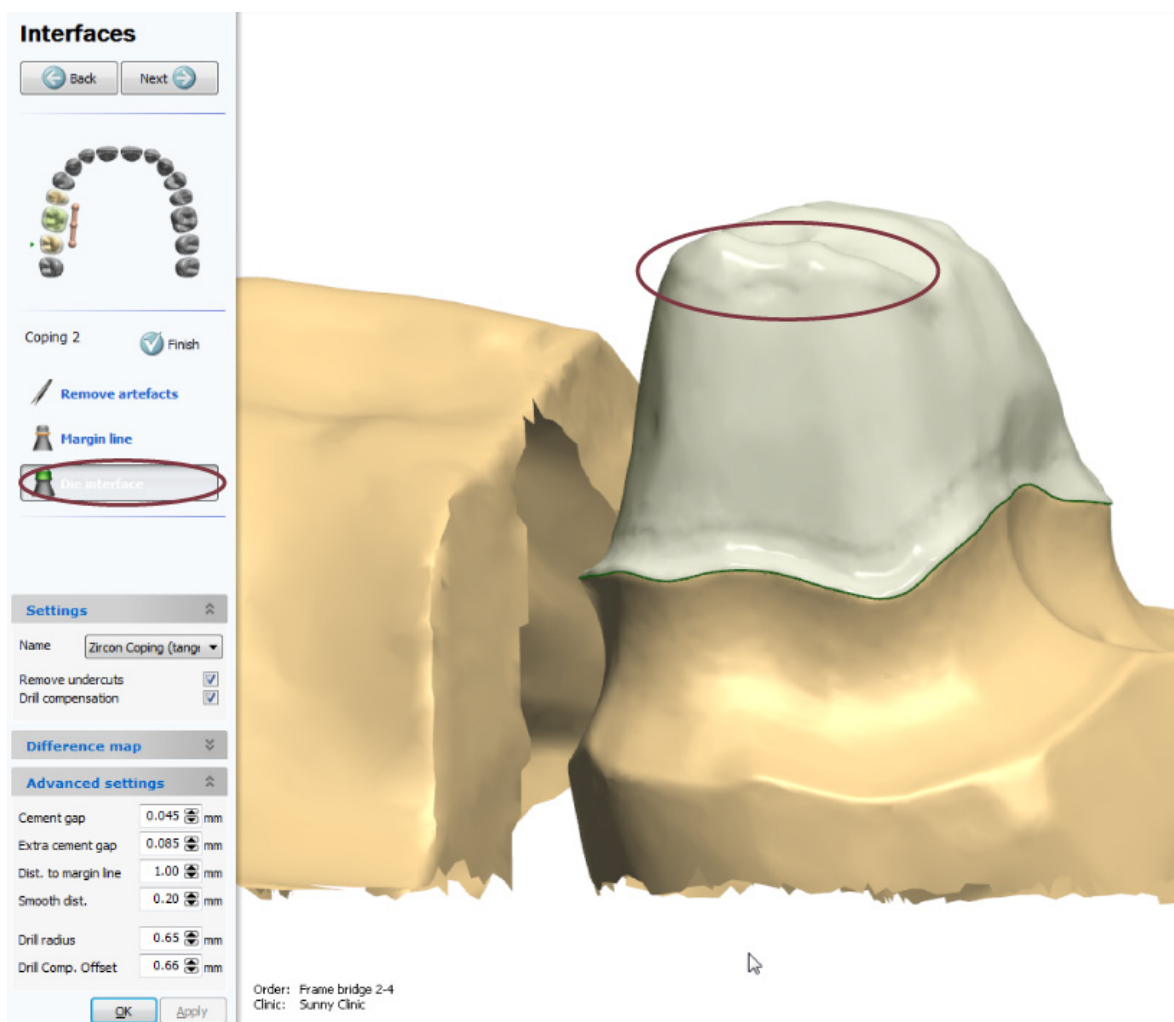
Check the **Individual insertion direction** check-box first to activate this function. The **Deviation from global** shows you the deviation from the global insertion direction.

Click **Apply** to view the result, click **OK** to move to the next **Die interface** stage.

DIE INTERFACE

At this stage the scanned model is being cut with the help of the defined margin line. The remaining part of the model is offset to create the inside (called "interface") of the item being modelled.

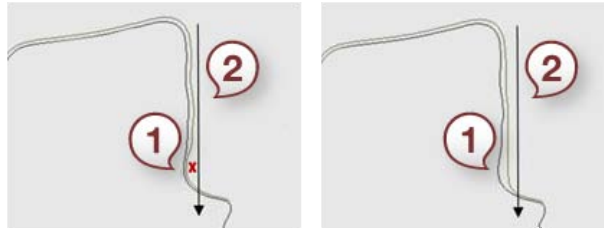
The modeling window on this stage looks similar to the following image:



Elements in the **Name** drop-down menu are used for creating the interface. Each element corresponds to the material specified in Dental System Control Panel (and selected in the Order Form), thus, users can build up a list of preferred settings using this application.

Undercut areas are often compensated for, to make it possible to insert the restoration onto the dies. There may also be production issues having undercuts in the final models. The undercuts are removed by checking the **Remove undercuts** check-box.

The effect is illustrated in images below:



1. Undercut
2. Insertion direction

1. Undercut removed
2. Insertion direction

If a milling machine is used for production, it might be necessary to use the **Drill compensation** function. This compensation adds additional offset to the interface in areas having too high curvature compared to the radius of the applied drill tool. This ensures that milling of the interface is possible, which, in turn, guarantees a better fit to the final manufactured restoration.

The amount of offset can be visualized using the buttons in the *Difference map* settings.

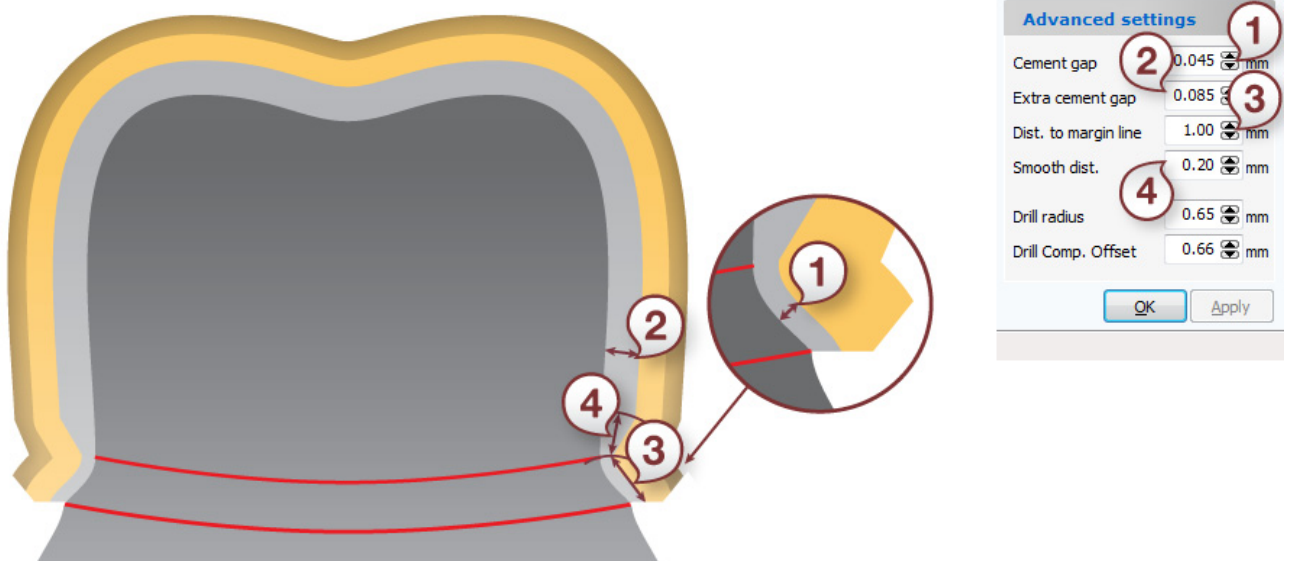
To view the difference between the offset model and the scanned reference model, select the **Thickness** button. The die interface becomes colored accordingly.

When the **Undercut removal** button is selected (it is only enabled when **Remove undercuts** in the Settings group is checked), the color map displays the amount of undercut removal performed.

When the **Drill compensation** button is selected (it is only enabled when **Drill compensation** is checked in the Settings group), the color map displays the amount of drill compensation performed.

The **Depth value** shows the offset when you move the mouse cursor over the item.

The properties of the die interface are specified under *Advanced Settings*.



Cement gap (1) is the amount of offset in the area of the margin line.

Extra cement gap (2) is the amount of offset in the upper part of the interface.

Dist. to margin line (3) is the distance from the margin line to the borderline marking the border between the cement gap and the extra cement gap offsets.

Smooth dist. (4) is the area around the borderline in which the interface is smoothed. This ensures a smooth transition between the two parts of the interface having different offsets.

Drill radius is the radius of the spherical drill tool applied (only relevant when applying milling machines in the production step). **Drill Comp.offset** is the distance from the margin line that defines where the drill radius is applied.

Click **Apply** to view the result, click **OK** to complete the process. To move to the next **Design** step, click **Next**.

COPINGS

This section describes the modelling processes for both standard and anatomical copings.

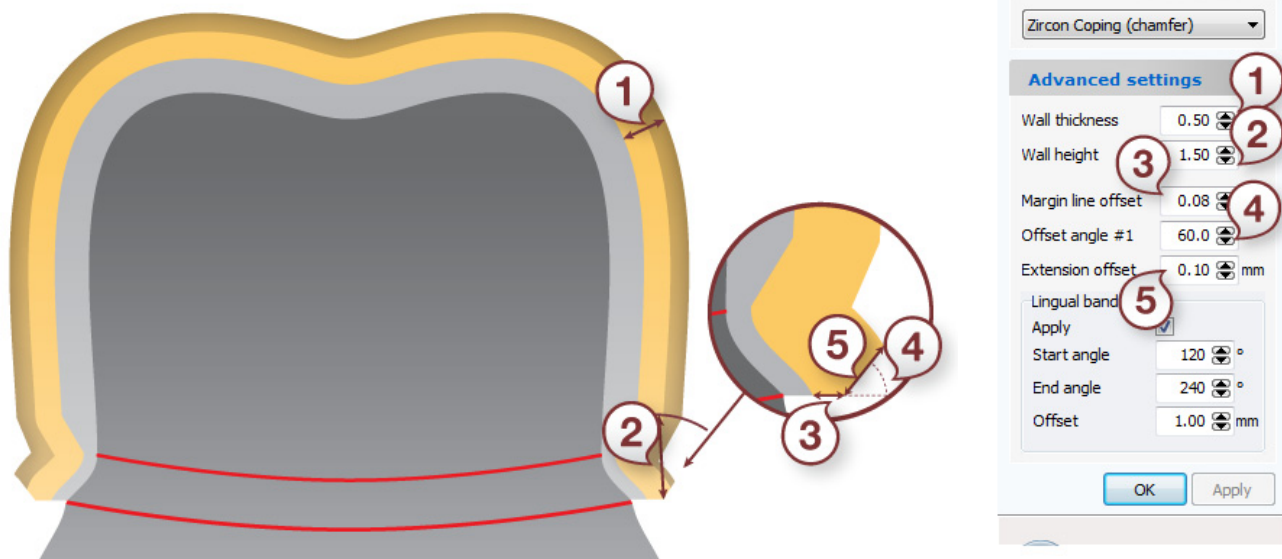
1. Standard coping

When you proceed to the **Frame design** step, DentalDesigner automatically places copings and pontics but you can always modify them as desired.

Click on the **Coping** button in the Process toolbar to specify the settings for your coping (see image below).

Select the element from the **Coping** drop-down menu to choose the settings for creating the outside of the coping (the settings are pre-defined in Dental System Control Panel).

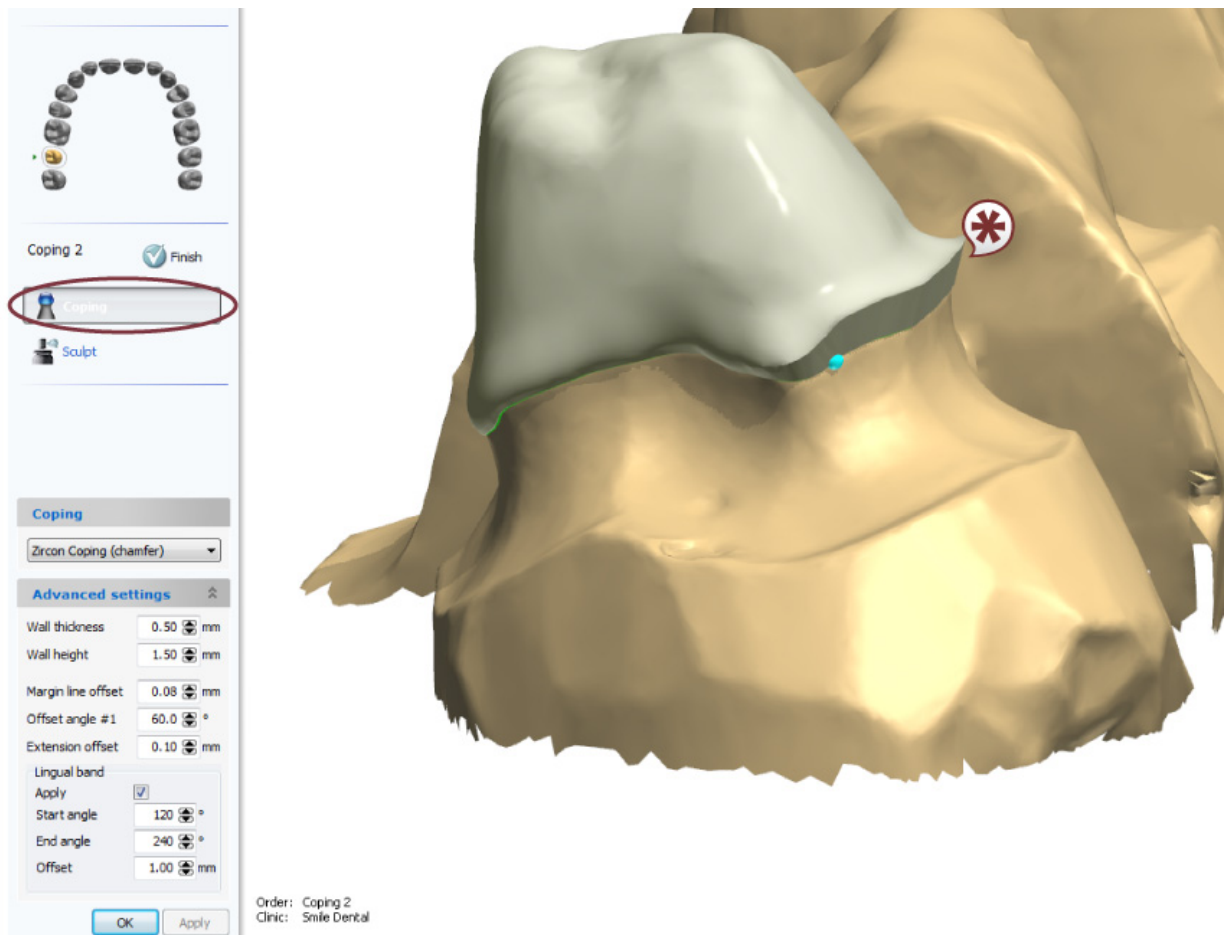
Advanced Settings:



Wall thickness (1) is the normal amount of offset i.e. the thickness of the coping.

Wall height (2) is the distance from the margin line to the borderline marking the beginning of the area where the wall thickness is applied.

Margin line offset (3), the **Offset angle #1** (4), and the **Extension offset** (5) are all used for defining the overlay shape near the margin line.



* Lingual band

The **Lingual band** settings define the lingual band of the coping (see image above).

When **Apply** is checked, the lingual band is created.

Start angle defines the starting angle of the lingual band (counting from the user defined annotation in counter-clockwise direction).

End angle defines the end angle of the lingual band (counting from the user-defined annotation in counter-clockwise direction).

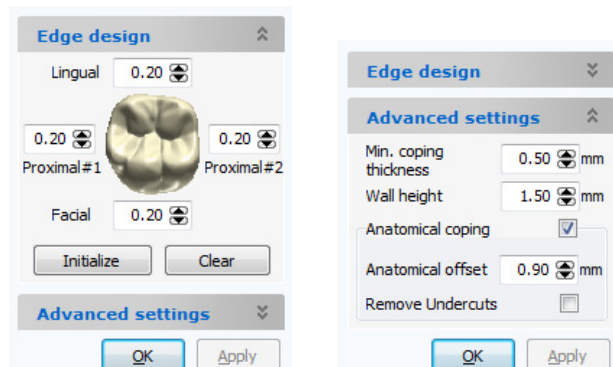
Offset is the offset applied in the lingual band area.

Click **Apply** to view changes, click **OK** to go to **Sculpt**.

2. Anatomical coping

The anatomical coping is designed from a crown ("outside-in"), which means that during the modelling process you have to go through **Design Anatomy** step first and design a crown and then model a coping at the **Design Frame** step.

After the crown has been modelled and you appear at the **Design frame** step, specify the settings for your coping in the Tool Forms.



To create an Edge design for you anatomical coping define the **Lingual, Proximal #1, #2** and **Facial** settings as shown on the image above (left).

Click **Initialize** to view the result. Click **Clear** to delete changes.

Min. coping thickness - is the minimum wall thickness of a coping.

Wall height - is the distance from the margin line to the borderline marking the beginning of the area where the wall thickness is applied.

Anatomical offset - is an internal offset from the crown ("outside-in") that actually creates your anatomical coping.

When you select the **Remove Undercuts** check-box, the **Angle** slide-bar appears that lets you define an angle starting from the insertion direction (obliquity) for undercuts removal.


Click **Apply** to view changes, click **OK** to go to **Sculpt**.

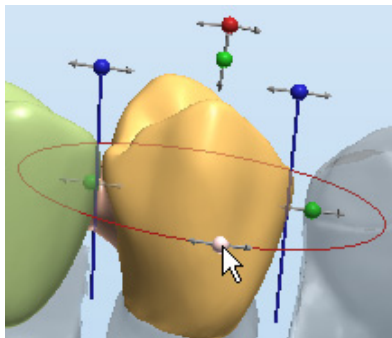


Sculpt



The **Sculpt** toolkit is a set of useful tools, which appears as the last stage of the modelling steps to enable you to transform and shape your restoration. The tool is the same for all kinds of restoration items.

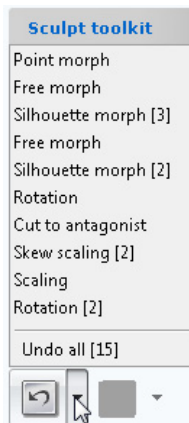
The **Global transformations**  button allows you to move, scale and rotate the model.




The model is rotated by clicking and dragging one of the central points marked red (see image to the right). The adjacent arrows illustrate the direction of the orientation.

Drag the blue points to change the shape of a top part of a model by moving it sidewise.

Drag the green points to change the shape of a whole model by moving it sidewise, back and forth or up and down. Points become yellow when activated. The view of all points changes depending on the view direction (top, front etc.).




Click the **Undo operation**  button to cancel the latest operation.

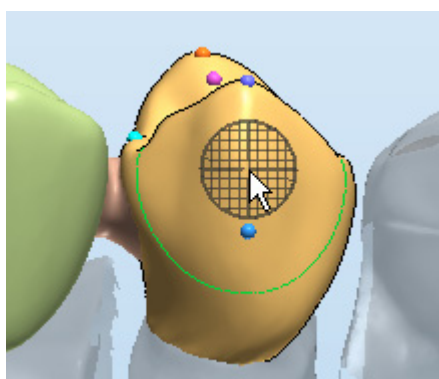
To cancel the previous changes to the model, click on the little black arrow next to the button and select the operations you want to cancel (see image to the left).




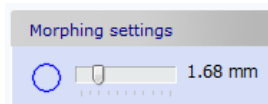
Note! To cancel any operation, the operations following it has to be cancelled as well.

The same principle works for the **Redo operation**  button.

Proceed to the next tool for more editing or click **OK** to complete the process.



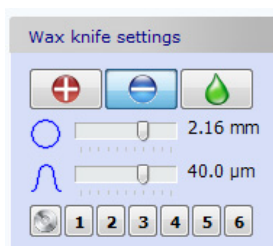
The next tool is called **Morphing** . It helps you shape your restoration item by dragging specific parts of it. Place the special round net on the model and move that part of the model as desired (see image to the right). The net can change its color and position depending on the view direction (top, side, etc.).




In the *Morphing settings* window that appears when you select the **Morphing** tool, you can set up the radius of morphing application by dragging the bar. The radius can also be changed by holding the **Shift** button and moving the mouse wheel.


Use the colored control points for morphing by clicking and dragging them as desired.

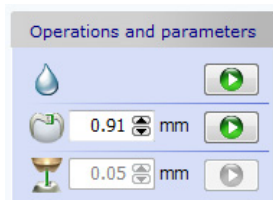
Hold **Shift** to move all areas of the same color.
Hold **Ctrl** to move an area orthogonally.
Hold **Alt** to add/remove control points.







Use the **Wax knife**  tool to add  / remove  material to the model


and to smooth  its surface. Choose one of the three options and click (or paint) on the model to apply the operation. Select the radius and level of the influence of the wax knife by using the two slide-bars (or use **Shift** + mouse wheel and **Ctrl** + mouse wheel respectively).

Press the  button followed by one of the numbers to store the current tool settings. This allows you to go back to any of them later on by simply pressing the number.

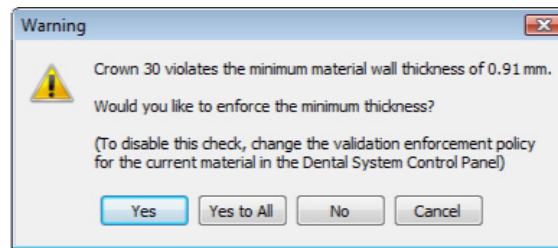


The last tool is **Operations and parameters** .

By clicking on one of the  buttons you let it automatically smooth  the entire surface of the model, enforce minimum thickness  or/and  cut the model to antagonist. You can specify the minimum thickness and the desired distance to the antagonist. If you are working with a pontic, the desired distance to gingiva can be specified.

Enforce minimum thickness functionality - in the process of modelling a restoration you can accidentally violate the minimum thickness. This can be easily fixed though by clicking the **Enforce minimum thickness**  button, which will automatically set the necessary thickness and correct your mistake. If the minimum thickness was not violated (or has been already fixed), after clicking the button you will get the following message: "The desired minimum thickness is already met".

This functionality also takes action when you move to the next step and the minimum thickness criterion is not met. In this case you get a warning as illustrated below suggesting you the automatic enforcement of the minimum thickness.



Click **OK** to end the process of using **Sculpt** toolkit. Click **Next** to move to **Finalize** step.

5.2.2.2 Bridge Framework

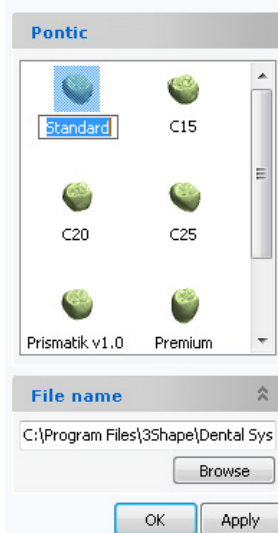
Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

Load Pontic Model



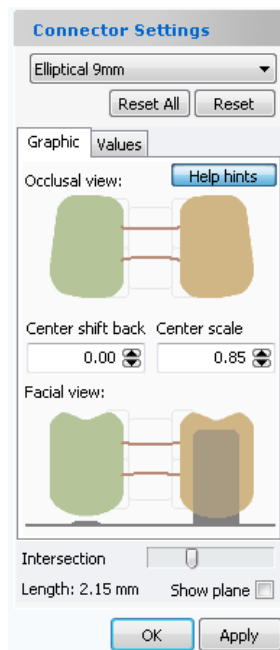
To modify a pontic, double-click on it in the modelling window or in the Overview toolbar. The Process toolbar will display two buttons: **Load pontic model** and **Sculpt**.

Click on **Load pontic model** to load a pontic model from the library as shown on the image to the left. The file name is automatically defined based on the current tooth. Click **Browse** to look for more pontic templates.

The **Pontic** stage only loads the model while the following **Sculpt** stage transforms the pontic to the desired position and shape (please see description of *Sculpt* in Single Coping chapter).

Copings - This stage is identical to *Coping* described in Single Coping chapter.

Edit Connector



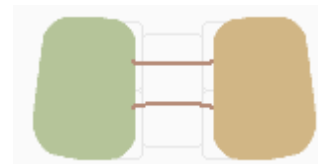
To modify connectors which DentalDesigner created automatically, click on connectors in the modelling window or in the Overview toolbar. You will get the *Connector Settings* window in the Tool Forms (see the image to the right).

DentalDesigner automatically defines the shape of the connector using the default shape set in the Dental System Control Panel. But you can change the shape by selecting a new one from the **Connector Settings** drop-down menu (*Silhouette, Circular* etc.).

The connectors' shape can be defined in different ways using either the graphical interface or the components in the **Values** tab.

By changing the **Center shift back** value you can adjust the scaling of the centre of a connector. By adjusting the **Center scale** value you can move the centre of a connector back and forward.

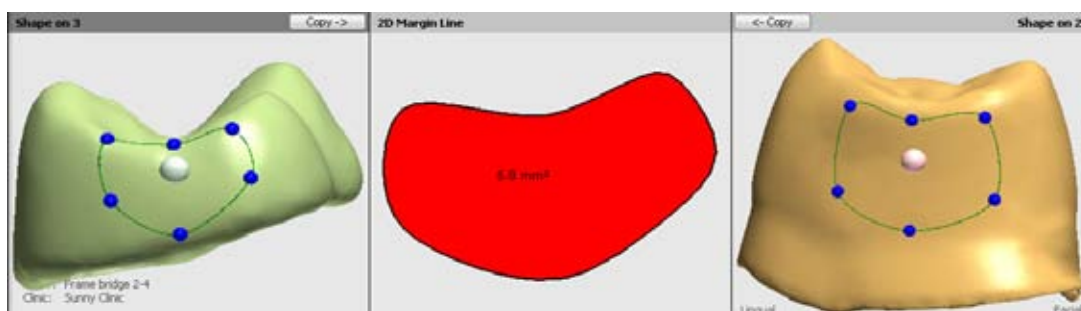
You can achieve both by inserting the necessary numbers in the fields or by manually dragging the connectors with a mouse:



All the changes are immediately reflected in the modelling window. You can also make changes directly from there. Click on the blue control points or/and on the big central points (one on each tooth) to move them as desired:



At this stage a special modifying window appears displaying the connectors' shape for both teeth as well as the 2D view of the connector:



You can modify connectors directly from here - click on the blue control points and drag them to form a shape you need. Do the same with the central points if you need to move them. The points become yellow when activated. The changes are immediately reflected in the modelling window. View the 2D cross section of the connector for more precision (the location of the plane that cuts the connector to display the 2D view can be changed using the **Intersection** slide-bar in the *Connector Settings*).

When you are done modelling connector on one side, click **Copy ->** or **<- Copy** to apply the same changes to the other side of a connector.

Click **Reset** or **Reset All** to cancel the changes and click **Apply** to implement them. Click **OK** to finish editing connectors. Click **Next** to move to **Finalize** step.

5.2.2.3 Full Anatomical Crown

Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

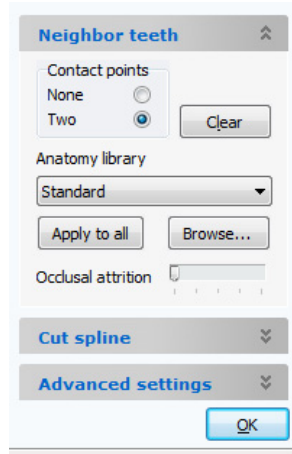
Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

Crown - When you proceed to the **Anatomy design** stage, DentalDesigner automatically places crowns and pontics but you can always modify them as desired.

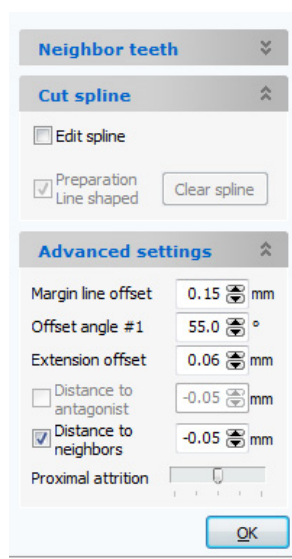
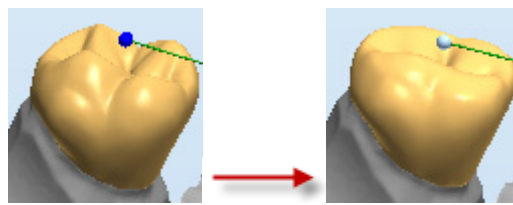
Click on **Crown** in the Process toolbar to modify crown(s).



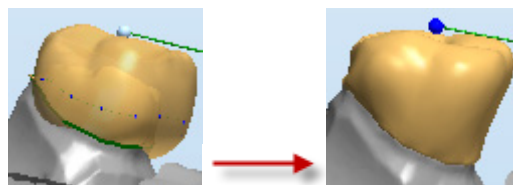
You can load different crown models out of the extended *Anatomy library*. In addition, you can click **Browse** to pick an arbitrary model. Click **Apply to all** to apply the chosen library to all crowns.

Contact points: by selecting **None** or **Two** in the window, you can choose how many contact points are to be used. To place the points, left-click on the surface of the neighbouring tooth where the contact with the crown will occur. Click **Clear** to delete the points.

To adjust the level of the crown's occlusion, use the **Occlusal attrition** slide-bar. Drag it with the mouse to set the necessary level of occlusion and wait a couple of seconds to get the result:



The **Cut spline** function serves for creating a smooth surface from margin line towards the spline. The spline is placed automatically when the *Cut spline* window is open. You can Edit existing spline or clear it and place a new one if required.



Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.

Coping - This stage is identical to *Coping* described in Single Coping chapter.

Split Files - This stage is identical to *Split Files* described in Full Anatomical Bridge chapter.

5.2.2.4 Full Anatomical Bridge

Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

Crown - This stage is identical to *Crown* described in Full Anatomical Crown chapter.

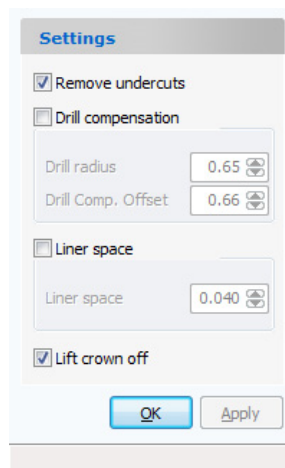
Load Pontic Model - This stage is identical to *Load pontic model* described in Bridge Framework chapter.

Copings - This stage is identical to *Coping* described in Single Coping chapter.

Edit Connector - This stage is identical to *Edit connector* described in Bridge Framework chapter.

Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.

Split Files - Split file stage allows for simultaneously combined design of a substructure and an overlying anatomical wax pattern for over-pressed crowns and bridge structures. Two separate files are automatically prepared for the output: one for the anatomically correct coping and the second one for the pressed pattern. These files can then be automatically transferred to the respective manufacturing equipment.



Liner space - when checked allows you to specify the amount of liner space between the anatomy and the framework bridge.

After you click **Apply** the **Lift crown off** check-box becomes active.

Lift crown off - when checked, lifts the anatomy from the framework.



5.2.2.5 Anatomical Copings and Framework

Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

Load Pontic Model - This stage is identical to *Load Pontic Model* described in Bridge Framework chapter.

Anatomical Coping - This stage is identical to *Anatomical Coping* described in Single Coping chapter.

Edit Connector - This stage is identical to *Edit Connector* described in Bridge Framework chapter.

Edit Bar - This stage is identical to *Edit Bar* described in Bar chapter.

5.2.2.6 Inlay/Inlay Bridge

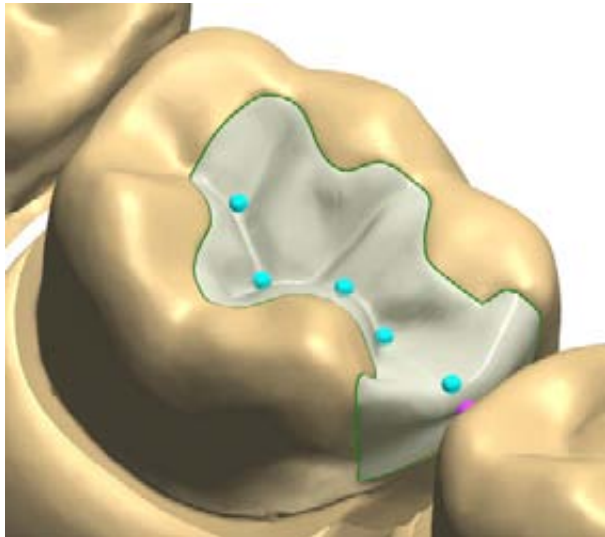
Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

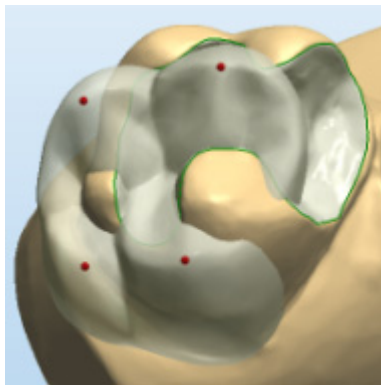
Inlay



The 3Shape Dental System fully supports the design of inlays, onlays and veneers, which lets you design single inlays, onlays, veneers and inlay bridges quickly and more accurately than possible with manual design methods.

During each phase of the design process, DentalDesigner calculates and suggests the appropriate designs and selections. The shape of the inlay, onlay or veneer is automatically morphed to match the original anatomy of the treated tooth, the proximal and antagonist surfaces. Yet, you can modify the suggested anatomy designs using the Sculpt toolkit.

When you proceed to the **Anatomy design** stage in DentalDesigner, it automatically places inlays but you can always modify them as desired.



Click on **Inlay** in the Process toolbar to modify the inlay(s).

When on the **Inlay** step, place the red control points (see image to the left) on the relevant cusps. Once placed on the cusps the points turn yellow. Click the **Create/Modify** button to initiate the anatomy morphing of the inlay.

After the morphing the blue control points appear on the inlay (see image above) and you can move and place them as desired.

State

Select Model Create/Modify

Anatomy library

Standard

Apply to all Browse...

Neighbor contact points

None ☐

One ☒

Two ☐

Clear Apply OK

State

Select Model Create/Modify

Advanced

☐ Adjust To Antagonist

Snap distance 1 mm

Locality radius 1 mm

Material settings

Min thickness 0.4 mm

Transition 0.5 mm

Clear Apply OK

Click **Select Model** button to load different inlay models out of the extended *Anatomy library*. In addition, you can click **Browse** to pick an arbitrary model. Click **Apply to all** to apply the chosen library to all inlays.

By selecting **None**, **One** or **Two**, you can choose how many neighbor contact points are to be used. To place the points, left-click on the surface of the neighbouring tooth where the contact with the inlay will occur. Click **Clear** to delete the points.

Click **Apply** to perform automatic anatomy morphing by DentalDesigner.

The program brings you to the **Create/Modify** mode described further.

When **Create/Modify** is selected you can modify your inlay by manually placing the blue control points as desired. Click **Clear** to start over.

Mark **Adjust to Antagonist** check-box to activate **Snap distance** and **Locality radius** options. The special points for adjusting to the antagonist are not used directly, any point within the **Locality radius** can be moved to the antagonist. The **Snap distance** defines how far point can be moved from antagonist (if it is closer than the snap distance, the point is adjusted to the antagonist).

Transition specifies the distance from the preparation line where the minimum thickness is not fully applied. If a point on the inlay is further than the transition distance from the preparation line, it needs to satisfy the minimum thickness. If it is closer, the minimum thickness is smaller, decreasing to 0 at the preparation line, allowing for sharp edges.

Click **OK** to go to the *Sculpt* stage for the further inlay editing if needed.

Load Pontic Scan - This stage is identical to *Load Pontic Model* described in Bridge Framework chapter.

Edit Connector - This stage is identical to *Edit Connector* described in Bridge Framework chapter.

Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.

5.2.2.7 Onlay/Veneers

Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

Veneer - This stage is identical to *Inlay* as described in Inlay/Inlay Bridge chapter.

Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.

5.2.2.8 Over-pressed Crowns and Bridges

Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

Crown - This stage is identical to *Crown* described in Full Anatomical Crown chapter.

Load Pontic Scan - This stage is identical to *Load Pontic Model* described in Bridge Framework chapter.

Coping - This stage is identical to *Coping* described in Single Coping chapter.

Edit Connector - This stage is identical to *Edit Connector* described in Bridge Framework chapter.

Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.

Split files - This stage is identical to *Split Files* described in Full Anatomical Bridge chapter.

5.2.2.9 Single Wax-up

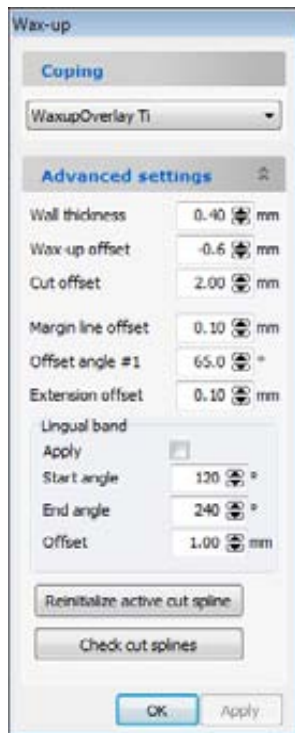
Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

Wax-up



A wax-up can be both a part of a bridge restoration and an individual item. All wax-ups have similar default settings during an operation.

The wax-up stage connects a previously scanned wax-up with a modelled interface.

Click the **Wax-up** button in the Process toolbar. A dialog box appears (see image to the left).

Select an element in the **Coping** drop-down box for the settings used in creating the outside of the wax-up.

The advanced settings define the shape of the overlay.

The **Wall thickness** is the minimal wall thickness allowed. This parameter is useful to ensure a minimum thickness when offsetting the wax-up inwards.

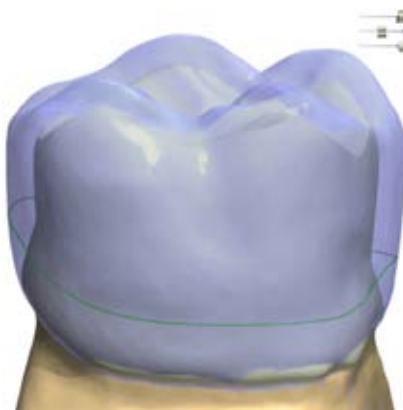
The **Wax-up offset** is the outer wax-up surface offset parameter allowing to offset modelled wax-ups inwards in order to make room for ceramics.



Note! A negative offset is applied inwards, whereas a positive offset is applied outwards.

The **Cut offset** is the distance between the margin line and the cut spline (indicated by the green arrow). The cut spline is used for cutting the scanned wax-up; the part above this spline is used when designing the wax-up model. The default placement of the cut spline can always be edited with the help of a Fast edit functionality which, when activated, lets you easily draw or click on the model for a quick and easy editing.

The rest of the settings (**Margin line offset**, **Offset angle #1**, **Extension offset**, **Start angle**, **End angle**, **Offset**) are similar to the *Coping* settings.



Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.

5.2.2.10 Wax-Up Bridge

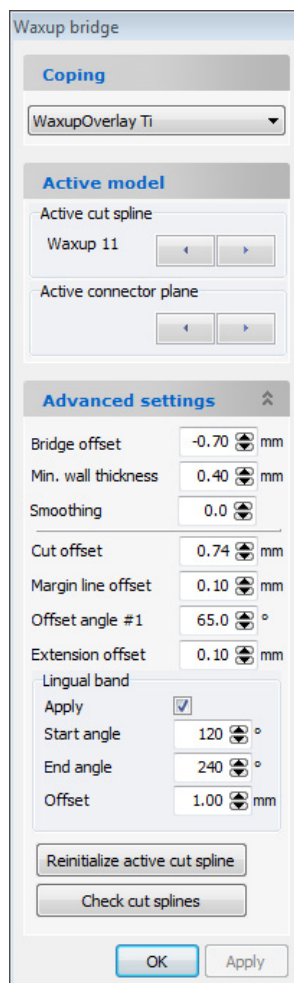
Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

Wax-up Bridge



When you model a wax-up bridge in DentalDesigner at the **Design frame** step, the program automatically places a wax-up bridge scan over the preparation scan and provides you with the necessary settings for further modelling.

Active cut spline arrows help you navigate between the wax-ups, making one cut spline active (green) at a time so you can easily edit it. The cut spline is used for cutting the scanned wax-up; the part above this spline is used when designing the wax-up model. The **Reinitialize active cut spline** button places the active cut spline in the initial position. The **Check cut splines** button validates the positioned cut splines and informs you if there is a problem (e.g. there appears a message "*Spline does not lie on the model surface, please reposition the spline*"). The default placement of the cut spline can always be edited with the help of a Fast edit functionality which, when activated, lets you easily draw or click on the model for a quick and easy editing.

Active connector plane arrows help you navigate between the connectors, making one connector plane active at a time.

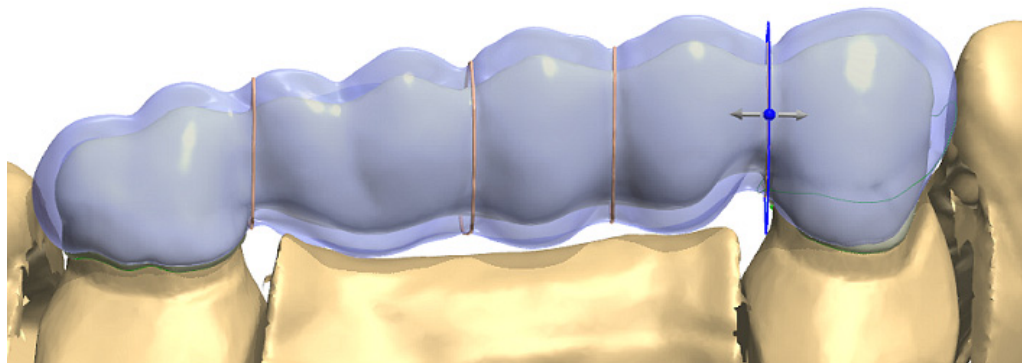
The **Bridge Offset** is the outer wax-up bridge surface offset parameter, which allows a modeled wax-up bridge to be offset inwards to make room for ceramics.

The **Smoothing** parameter lets you change the smoothness of the wax-up surface.

The **Cut offset** is the distance between the margin line and the cut spline.

The rest of the settings are similar to the standard coping (please see *Coping* section of the Single Coping chapter for more details).

Click **Apply** to view the changes. Click **OK** to go from the **Wax-up bridge** stage to the **Sculpt** stage.



Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.

5.2.2.11 Telescope

Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

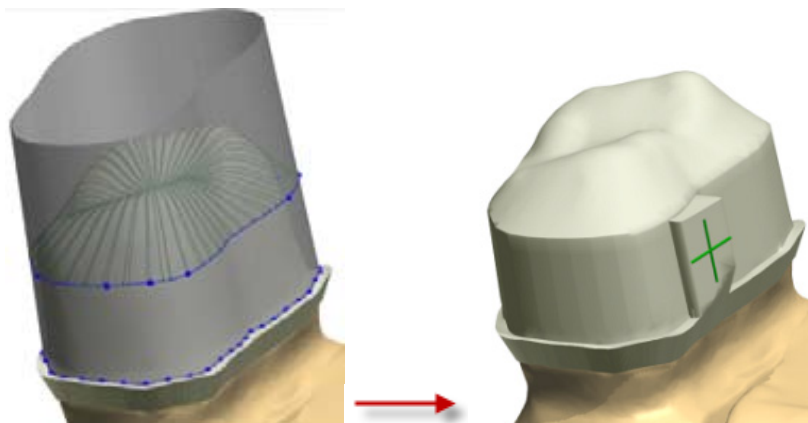
Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

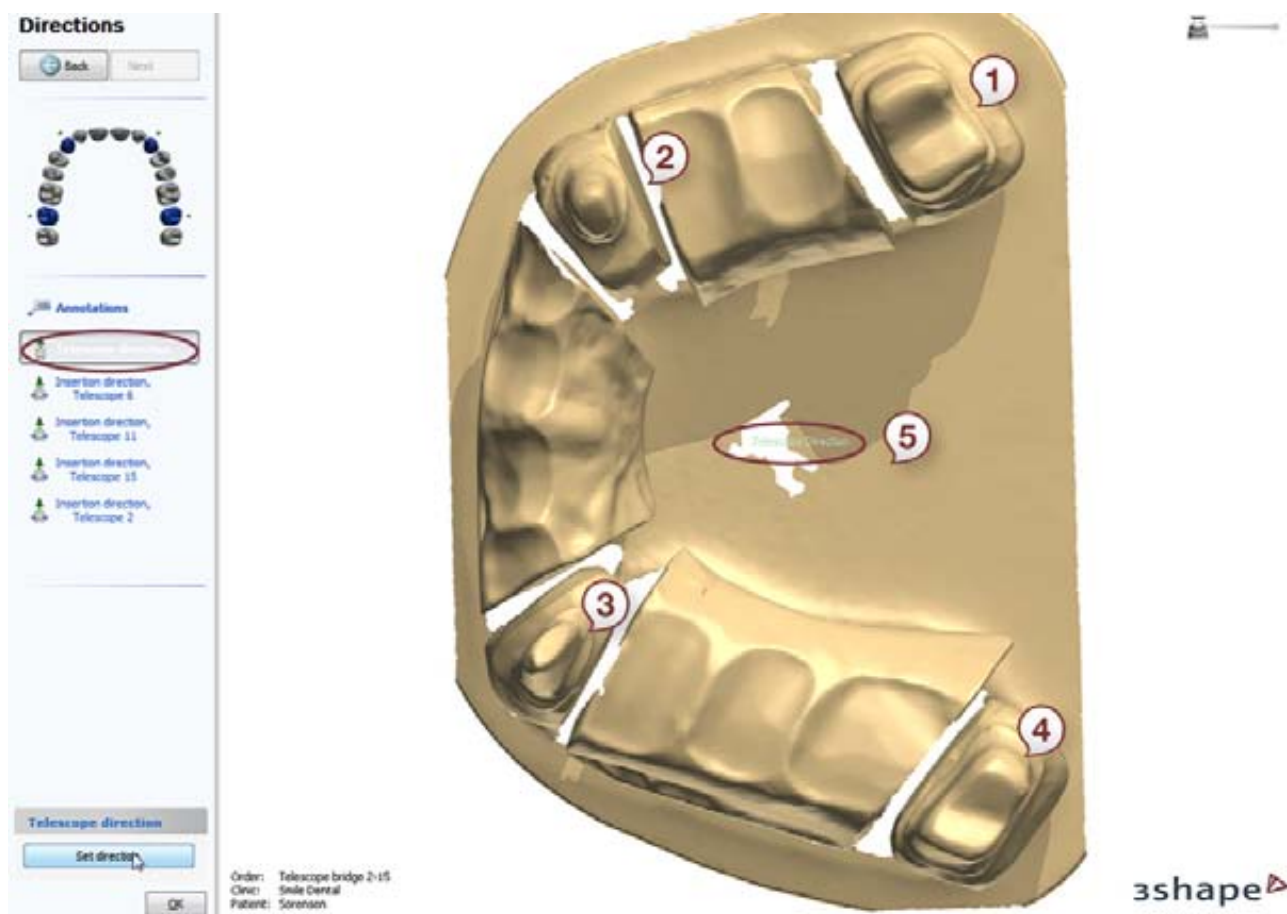
At the **Design telescopes**  step, which consists of **Primary telescope overlay**, **Optional components** and **Sculpt** stages, the telescope is modelled.

The images below illustrate the initial model and the final result of the **Design telescopes** step (see the following sections for more information).



Telescope Direction

Telescope direction is only active when you are modeling a telescope. If there is more than one telescope, all telescope will have the same direction however, they will have different insertion directions (see the following image).

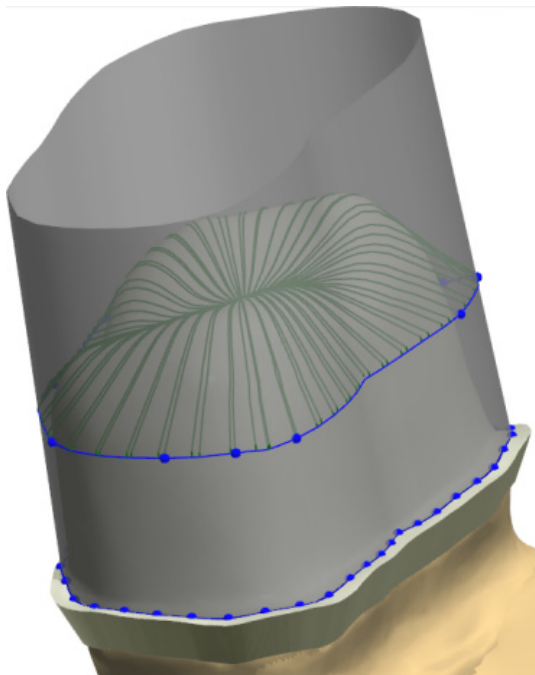


- 1-4. Telescopes
5. One telescope direction

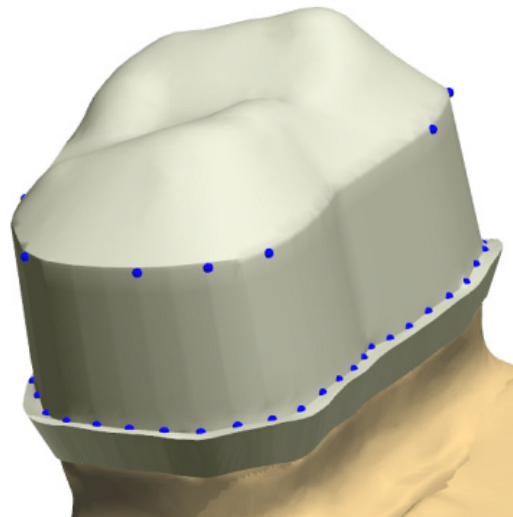
The **Telescope direction** stage is automatically activated when you leave **Annotations** stage. The **Set direction** button appears in the Tool Forms. All telescope preparations are initially rotated into a position proposing a common telescope direction. You can rotate the model into your preferred position and press the **Set direction** button to save the current point-of-view as the telescope direction. Click **OK** to move to the **Insertion direction** step.

Primary Telescope Overlay

At the **Primary telescope overlay** stage the program automatically creates an initial telescope that you can modify as desired. The primary telescope consists of two separate parts: the basis coping and the telescope cone (grey). The basis coping defines the shape of the telescope rim and guarantees minimum distance between the final telescope surface and the interface. The basis coping settings can be adjusted on the *Base coping settings* group, which contains the same options as a regular coping (please see *Coping* section of the Single Coping chapter for more details). After the modelling, the telescope surface will replace the basis coping overlay surface.



Before clicking **Apply**



After clicking **Apply**

The upper and lower limits of the telescope cone are defined by the shape of the (blue) upper and lower control points. The upper control points define the transition between the angular telescope cone and the curved telescope top. The shape can be adjusted both manually by dragging the control points along the telescope cone surface or using the settings.

The points can be added and removed with the right-click on the blue line and selecting **Add/Remove**. The right-click menu also offers a **Fast edit** functionality which, when activated, lets you easily draw or click where desired for the program to place points automatically.

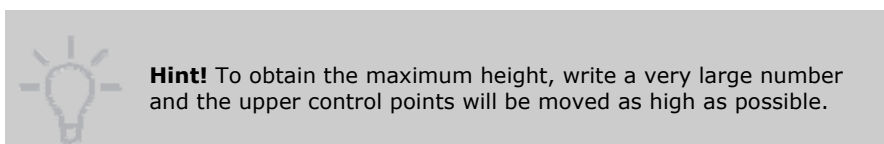
The lower control points define the transition between the telescope cone and the basis coping surface as well as the shape of the cone. The shape can be adjusted manually by dragging the control points. If the telescope cone surface intersects with the basis coping surface, the lower control points (and the connecting lines) that need to be moved will be marked with red.



Note! You will not be allowed to complete a telescope with intersecting cone and basis coping surfaces.

The shape of the telescope can be adjusted through the **Primary crown settings** group:

- The **Angle** of the telescope is measured along the telescope primary direction and can be adjusted dynamically.
- The **Smooth** slide bar changes the smoothness of the (green) telescope top lines, that define the shape of the top. When no smoothness is applied, the lines follow the surface of the basis coping.
- The **Min. height** parameter shows the current minimum telescope cone height, defined as the minimum distance between the upper and lower control points. When changing the value, the current upper control points will be moved up or down to adjust to the new height.



- When selecting the **Prep. line shape** checkbox, the upper control points are initialized to have the approximate shape of the margin line.
- Specify the desired distance between the points using the **Point distance** parameter.
- To initialize all control points, press the **Initialize** button.
- For a fast preview of the final telescope surface shape, press the **Preview** button. The telescope surface will then be visualized, as it would look upon completion.

Press **Apply** to generate the complete primary telescope or click **OK** to finish.

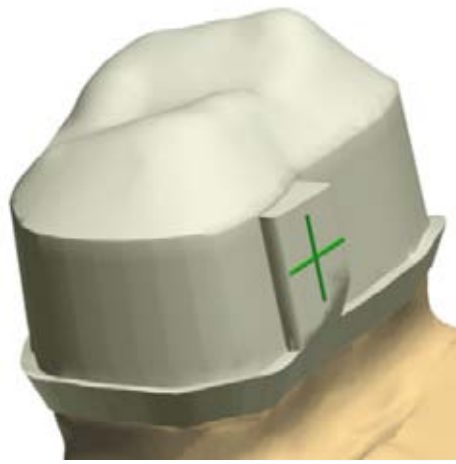
Optimal Components

The next stage - **Optional components** offers the option to attach a model component on the side of the telescope. Click on the telescope surface to set the position of the attachment. A point, indicating the position, will appear. This point can be dragged along the surface or removed again when pressing the **Clear** button. The green cross at the point indicates the angle and depth of the attachment. These parameters can be adjusted using the following settings:

- The **Name** drop-down box offers a list of components that you can choose from.
- The **Adjust angle** slide bar changes the insertion direction angle of the attachment.
- In the **Min. dist to interface** edit box, the minimum distance between the telescope interface and the frontal surface of the attached component can be adjusted. The green cross is moved either inwards or outwards accordingly.
- To attach the component press **Apply**. The component can be repositioned by moving the attachment point (remember to also readjust the angle) or remove by pressing **Clear**.

Click **OK** to complete the stage. If you want to modify your telescope, go to **Sculpt** stage to use the Sculpt toolkit (please see *Sculpt* in Single Coping section for more details).

Go to the **Save** step to save your telescope.



Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.


5.2.2.12 Customized Abutments

Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

At the **Design abutments**  step you can model abutment in two different ways:

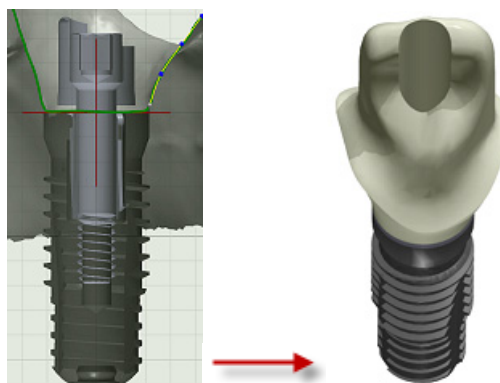
1. Using the Parametric Abutment Generation tool (default) which is activated/deactivated from *Dental System Control Panel* -> *System Settings*. The new parametric way of designing abutments offers you the ability to design Custom abutments much faster, and in a more unified way. The **Emergence profile** and **Top-cap design** steps have been merged into one and the option to change the insertion direction of individual abutments at the **Design** step is made available, rather than having it at the **Directions** step, as it is done with the traditional method.

When using the Parametric Abutment Generation tool the stages of the **Design abutment** step are **Parametric**, **Sculpt** and **Assembly**.

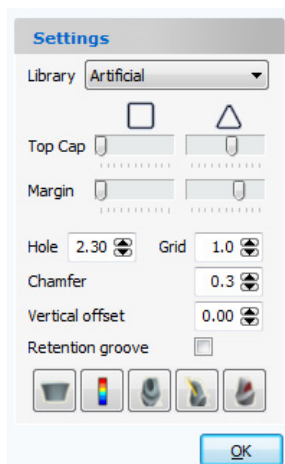
2. Using the traditional method. In this case the stages of the **Design abutment** step are **Emergence profile**, **Load**, **Top cap**, **Sculpt** and **Assembly**.

If you are modeling a single custom abutment, another way to select the traditional method of designing an abutment is to select Dental System 2008 instead of Dental System 2009.

Both methods are described further. The images below illustrate the initial model and the final result of the **Design abutments** step (see sections below for more information).



Parametric



At the **Parametric** step you can select the desired library - *Anatomical*, *Artificial* etc.

Top cap and **Margin** slide bars help you shape the top cap and the margin line of the abutment respectively. You can choose either the rectangle or the triangle shape for this purpose.

Hole - is the diameter of the abutment hole.

Grid - is the size of the grid that appears when you place the cursor over the orange control points and the size of the arrows that appear when you place a cursor over the blue control points.

Chamfer - is lofting of the surface between the margin line and the top cap spline.

Vertical offset - is the distance from the bottom of the abutment where the offset is applied.

Retention groove - when checked, creates a groove in the abutment to prevent the crown from rotating on a round abutment.

The following buttons can be activated to show/hide some of the objects/features on the abutment:



Hides top cap



Shows distance color map



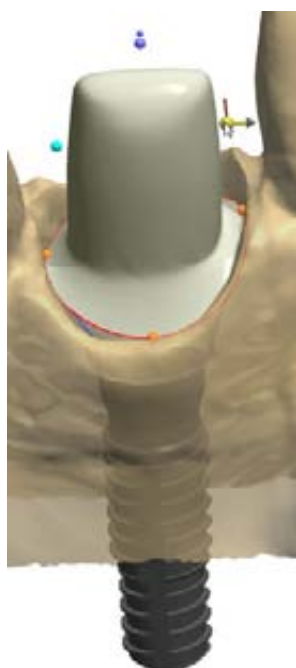
Shows/Hides abutment screw hole



Shows/Hides implant direction cylinder

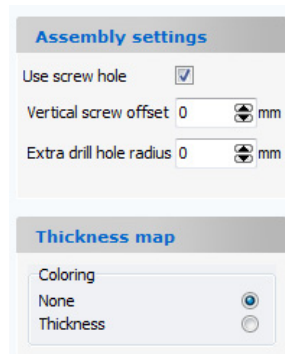


Shows/Hides undercuts



Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.

Assembly



The **Assembly** step helps you improve the internal structure of the abutment top cap.

Choose the **Use screw hole** check-box to create a screw hole from the top of the abutment top cap (set by default).

Define the **Vertical screw offset** and the **Extra drill hole radius** in mm. To better view the changes in the visual appearance of the model, use the *2D cross section* window.

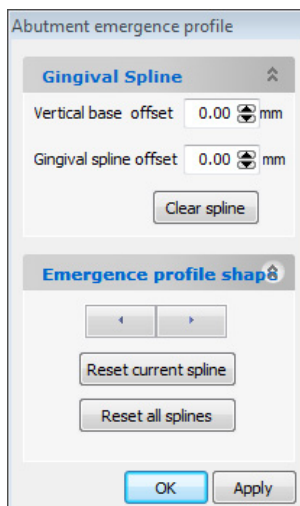
The **Thickness map** is a useful option to have a clear idea about the thickness of the complete abutment top cap structure.

Go to the **Sculpt** step to make the corrections in the external view of the abutment (please see *Sculpt* section for more information).



Emergence Profile

As was mentioned above, the traditional way of designing abutments (and not using the Parametric Abutment Generation tool, which in this case should be disabled in Dental System Control Panel) consists of the following steps: **Emergence profile**, **Load**, **Top cap**, **Sculpt** and **Assembly**.



At the **Emergence profile** step, the shape of an abutment emergence profile is created. This process involves definition of the emergence profile (marked with a green line) and subsequent editing of the sub-gingival (emergence profile) shape.

The emergence profile can be designed in two ways:

1. By left-clicking on the model and placing the blue control points that are automatically connected to form a gingival spline. To close the spline, left-click on the point that was placed first.
2. By drawing the spline manually with the left mouse button pressed. The estimate spline will then be automatically levelled and marked with the control points for further editing.

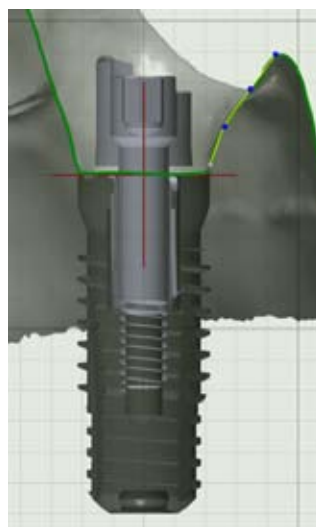
You can edit the resulting gingival spline by moving the control points or pressing the **Clear spline** button to start placing the spline once again. You can also set the **Gingival spline offset**, which defines the distance between the gingival spline (on the abutment model) and the corresponding spline on the gingiva (on the scan).

Vertical base offset - is the distance from the bottom of the abutment where the offset is applied.

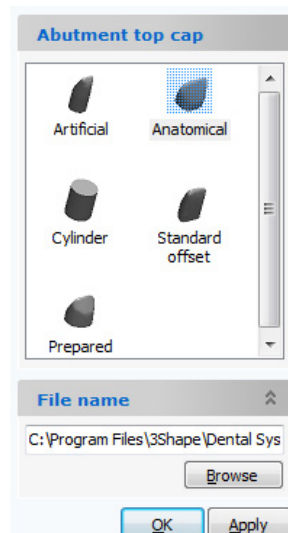
To edit the vertical dimensions of the emergence profile, unfold the **Emergency profile shape** group of settings. This will automatically provide a digital image of the cross-section of the model and rotate its profile to display the first profile spline ready for editing.

To edit individual emergence profile splines, use the mouse to change the position of the points. Click on the blue arrows or use the arrow keys on the keyboard to move from one spline to another. If you are not satisfied with the design job done, click on the **Reset current spline** or **Reset all splines** buttons to start over.

Click **Apply** to view the changes. Click **OK** to move to the next step.



Load



At the **Load** stage you can load a template abutment top cap from the library.

At this stage you only load the model, while at the next **Top cap** stage you are able to model the selected top cap as desired.

DentalDesigner automatically selects a template top cap corresponding to the index of the tooth being modelled.

Click **Apply** to view the selected top cap. Click **OK** to move to the next step.

Top Cap



At this stage DentalDesigner provides a default position of the previously loaded top cap, however, you can transform the model as desired using a number of tools.

Transformation - move the model by left-clicking on it with the mouse. To scale the top cap, left-click and drag one of the green control points (when pressing **Shift**, the top cap will be scaled in all directions).

Rotation mode - specifies how the top cap is rotated. If **Axis** is checked then the rotation occurs in a given plane (marked yellow), while **Free** rotation results in a fully free rotation following the mouse movement. The top cap is rotated by clicking and dragging one of the central points (marked purple). The adjacent arrows illustrate the direction of the orientation.

Morph mode - when this check-box is selected, the silhouette of the cap is drawn and the mouse position is visualized by a grey circle, which marks the radius of the morphing effect (the radius of a circle can be changes by scrolling the mouse wheel). The red direction arrow specifies the centre of the area being morphed and the direction of the morphing in relation to the user. The top cap is morphed by dragging the silhouette (which turns green when active) or by clicking on a top cap and moving in and out.

Remove undercuts - removes undercuts when the check-box is selected.

Fit to Emergence Profile - automatically fits the top cap.

Deformation - the top cap can be modified with the help of a bounding box. Click and move the green control points (which turn yellow when active) or click on the blue string to move the three control points simultaneously (the string turns red when active). Select the **Reset control points** check-box to set the points in the initial position.

Edit top cap boundary - define the bottom boundary of a top cap by placing a spline on its surface. The red spline around the abutment cap specifies the maximal bottom boundary of the top cap. Click **Clear spline** to start over.

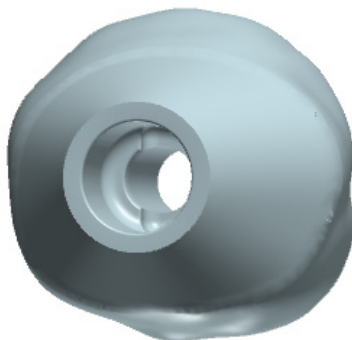
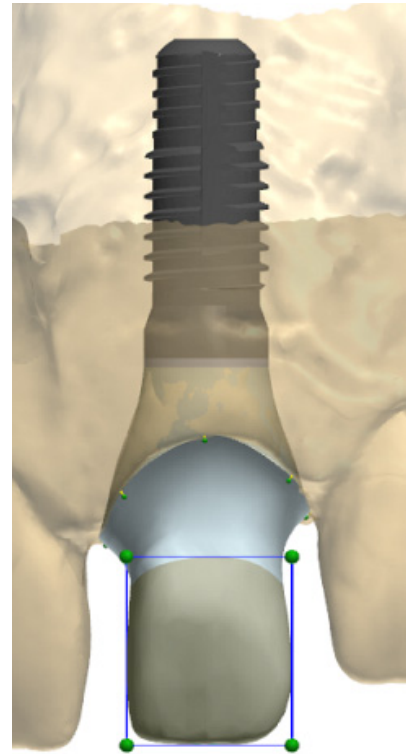
Show top cap angle - shows the angular value between the implant insertion direction (red arrow) and the vertical top cap direction (green arrow).

Show top cap undercuts - visualizes the undercuts on the design model.

Collisions between models - warns you with the *Collisions!* message in case there are collisions between the top cap and other models (*No collisions* message informs that no collisions were detected).

The **Undo** and **Redo** buttons are used to cancel or reapply the last actions made. The **Undo All** button deletes all the changes made.

Click **Apply** to view the changes. Click **OK** to go to *Sculpt* and *Assembly* steps.



Screw retained crowns are also supported by the system (see image to the left).

When on the **Save** step, the **Screw retained crowns** check-box can be selected. In that case the anatomy is brought together with the customized abutment and the system automatically makes a hole through the upper anatomy, so that the entire restoration can be fixed to the implant via a screw.

5.2.2.13 Implant Bars and Bridges

Implant Bars:

Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Parametric - This stage is identical to *Parametric* described in Customized Abutments chapter.

Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.

Assembly - This stage is identical to *Assembly* described in Customized Abutments chapter.

Edit Bar - This stage is identical to *Bar* described in Bar chapter

Implant Bridges:

Annotations - This stage is identical to *Annotations* described in Single Coping chapter.

Insertion Direction - This stage is identical to *Insertion Direction* described in Single Coping chapter.

Parametric - This stage is identical to *Parametric* described in Customized Abutments chapter.

Sculpt - This stage is identical to *Sculpt* described in Single Coping chapter.

Assembly - This stage is identical to *Assembly* described in Customized Abutments chapter.

Margin Line - This stage is identical to *Margin Line* described in Single Coping chapter.

Die Interface - This stage is identical to *Die Interface* described in Single Coping chapter.

Coping - This stage is identical to *Coping* described in Single Coping chapter.

Load Pontic Model - This stage is identical to *Load Pontic Model* described in Bridge Framework chapter.

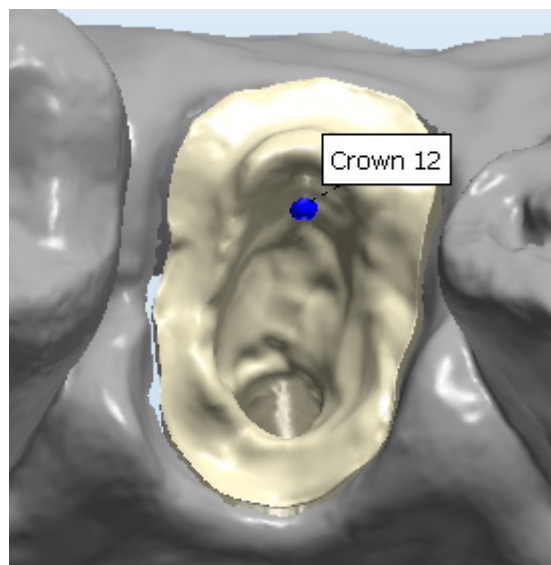
Edit Connector - This stage is identical to *Edit Connector* described in Bridge Framework chapter.

5.2.2.14 Post & Core

Annotations

This stage is identical to *Annotations* described in Single Coping chapter.

Correct placement of annotation point for Post & Core operation is shown on the image:



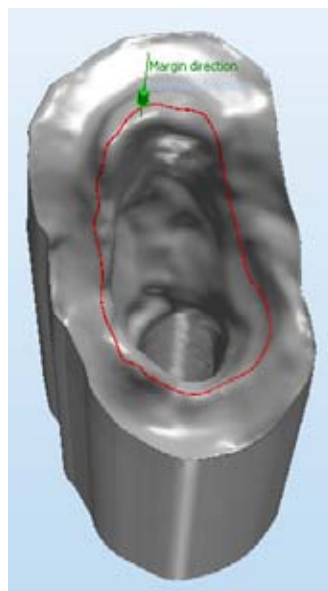
Insertions Direction

This stage is identical to *Insertion Direction* described in Single Coping chapter.

Margin Line

This stage is identical to *Margin Line* described in Single Coping chapter.

Correct placement of the margin line for Post & Core is illustrated on the image:



Die Interface

This stage is identical to *Die Interface* described in Single Coping chapter.

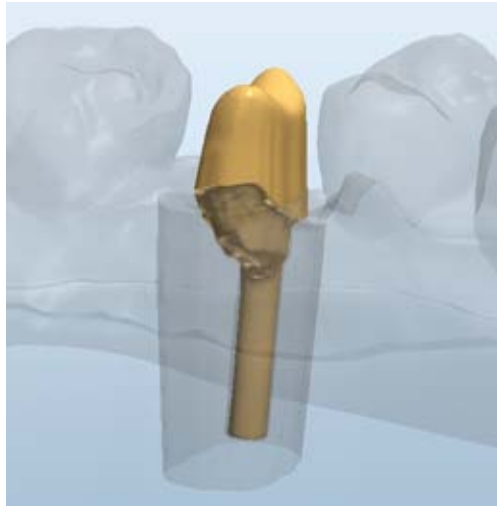
Crown

This stage is identical to *Crown* described in Full Anatomical Crown chapter.

COPING

This stage is identical to *Coping* described in Single Coping chapter.

The result of Post & Core modeling in DentalDesigner is shown on the image:



Sculpt

This stage is identical to *Sculpt* described in Single Coping chapter.

5.2.2.15 Digital Wax-Up Bridge

The digital wax-up bridge combines the advanced design options of the normal bridge modelling with the easy design associated with the standard wax-up bridge.

Utilizing the new advanced possibilities for modelling the anatomy bridge framework you can design the anatomy as desired. When the anatomy design is completed the frame layer is easily created using the existing *Wax-up bridge* functionality of the designed anatomy bridge. Finally, the entire frame layer can be finalized using the advanced sculpt functionality.

5.2.2.16 Bar

The **Edit bar** stage allows you to easily model complex bar structures insuring a high level of precision and parallelism.

The option to edit the shape of the bar for the customized bridge (e.g. abutment or telescope) is provided in order to improve and refine the design of the bar according to the anatomical shapes of the preparation surface and various stylistic and functional demands of the restoration type.

Apart from the advanced design setting that are provided in the Tool Forms, you can adjust the shape of the bar manually:

- The green spline on the top of the restoration defined by a number of blue control points marks the upper border of the restoration. It is intended to help you conveniently locate the changes applied visually.
- Rotate the model accordingly to see its horizontal dimensions. Move the blue control points to raise or to lower the active section of the bar.
- Rotate the model accordingly to see its vertical dimensions. Move the blue control points to move the active section of the bar closer to or further from the buccal area of the mouth.
- Check **Use straight lines** check-box to create a geometrically rigid angular shape of the bar.

Bar settings

Rectangle

Distance to spline: 0.00 mm

Distance to gingiva: 0.20 mm

Proximal gap radius: 0.50 mm

Use straight lines

Active cross section

Distance to spline: 0.50 mm

Width scaling: 1.00

OK

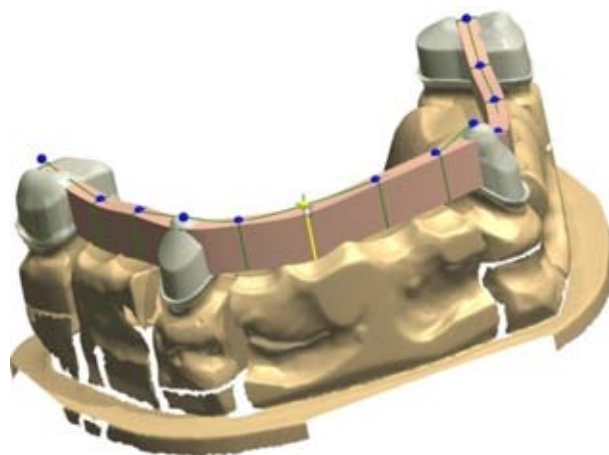
Apply

You can modify the shape of the bar in real time by selecting rectangle, ellipse or dolder bar shapes (this was previously specified in the Order Form: *Bridge -> Bar bridge -> Type*).


Define **Distance to spline** and **Distance to gingiva** and set the **Proximal gap radius** considering the radius of the space generated next to the restoration.

The bar is divided into sections that can be activated and edited one at a time. The active cross section turns yellow. You can define the parameters for **Distance to spline** and **Width scaling** for the specific cross section, which turns yellow when active.

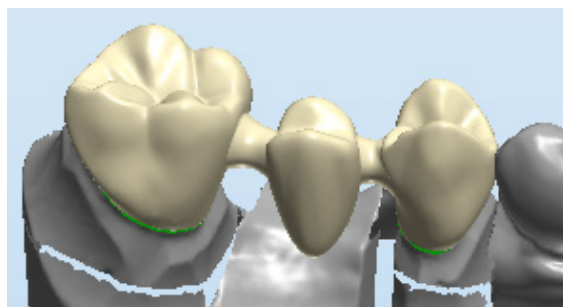
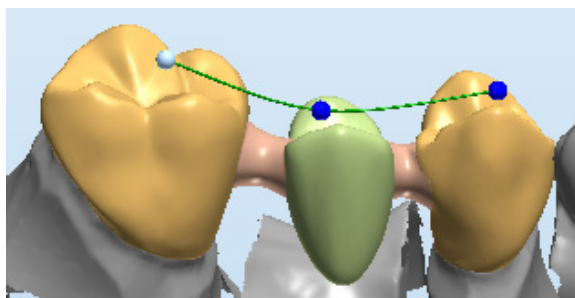
Click **Apply** to view the changes. Click **OK** to move to the **Finalize** step where you can use the **Sculpt Abutments** tool to make some final changes in the restoration (please see *Sculpt* section for more information).



5.2.3 Finalize Step

After you have completed one of the **Design** steps, click **Next** to go to the **Finalize**  step. The program allows you to view the final result of your modelling and make additional changes if needed.

The images below illustrate the initial model and the final result of the **Finalize** step:



Sculpt toolkit

Morphing settings

1.68 mm

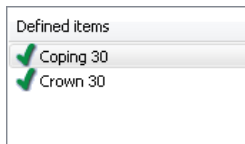
The **Finalize** step offers you the **Sculpt** toolkit to edit your restoration. This tool is the same as in the **Design** step, except for the **Global transformations** button which is not available here. Please see chapter *Sculpt* for a detailed description of this toolkit.




Note! Whereas in the previous steps you could only work with one item at the time, this step allows you to edit all items of the restoration at once.

Click **OK** to finish editing. Click **Next** to go to the **Save** step.

5.2.4 Save Step





When you go to **Save**  step, the program automatically saves your model. You can view a list of items that have been modelled in the **Process** toolbar (see image to the left).

Click **Close** to end the modelling of your restoration in DentalDesigner. DentalDesigner remains open until you manually close it.

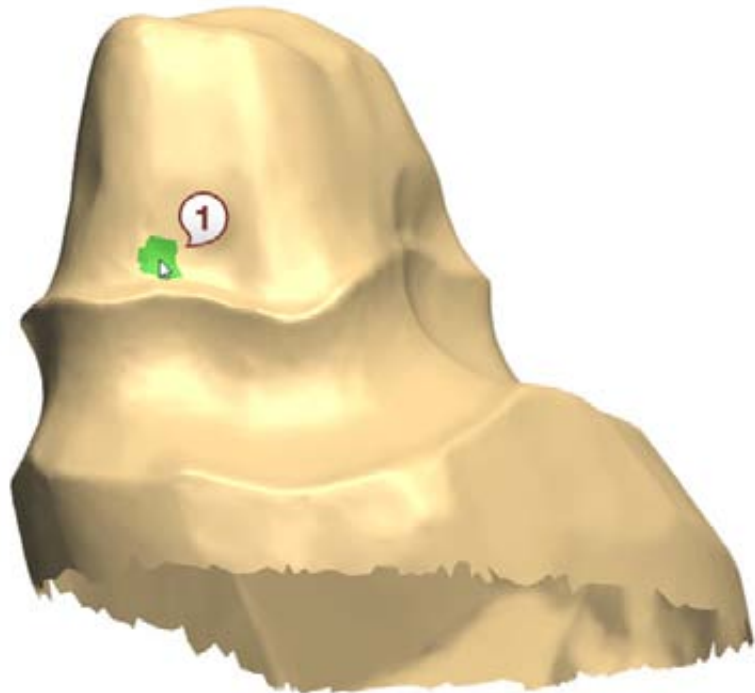
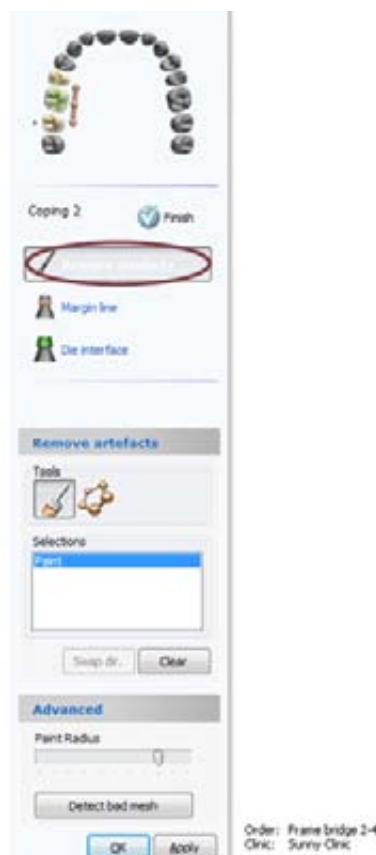
5.3 Optional Modeling Steps

5.3.1 Remove Artifacts

At this stage, the scan artifacts can be removed (e.g. bubbles, dents, bumps etc.).

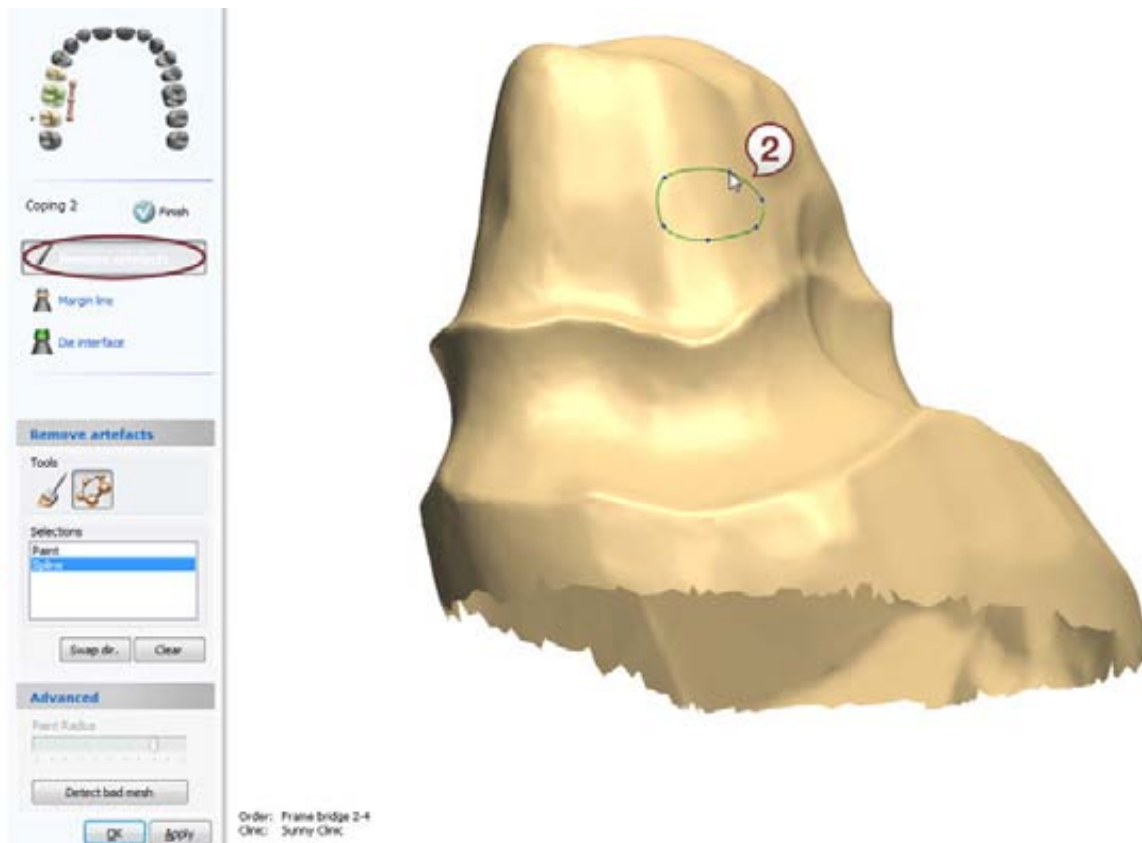
Notice, when you leave the **Directions** step to go to the **Interfaces** step, the program automatically brings you to **Margin line** and not to **Remove artefacts** (even though it comes first). This is because you generally do not need to remove artifacts. To save time you start working immediately on the margin line. If you do need to remove artifacts, click on this stage and use either **Paint**  or **Spline**  tool to do so.

To use **Paint**, select the tool, click on a desired place of the model and drag the mouse to color the specific area (see image next page). Use the **Paint Radius** slide bar to change the radius of the painted area.



1. Using Paint tool

To use **Spline** select the tool and form a circle from dots on a desired area of the model (see image below).



2. Using Spline tool



Note! When you form the circle clockwise, the changes occur outside the spline and when you form it counterclockwise, they occur inside the spline.

Click **Apply** to see the changes. If you put the spline by mistake in one direction instead of another, click **Swap dir.** to change direction. To view and correct bad triangulation on the scan, click the **Detect bad mesh** button. The area with poor triangulation will be highlighted in red color.

5.4 Modeling Tools


This section describes three modeling tools:

2D Cross-Section Window - allows better inspection of the dental models.

Distance Measurements - allow to perform Distance to Adjacent, Distance to Preparation Scan and Distance to Antagonist Scan measurements.

Validation - verification of the restoration model against the pre-set values.

5.4.1 2D Cross-Section Window

	Parallel View
	Perpendicular View
	Clear View
	Left Clipping Plane
	Right Clipping Plane
	Measure area
	Clear Measurement
	Zoom All
	Grid

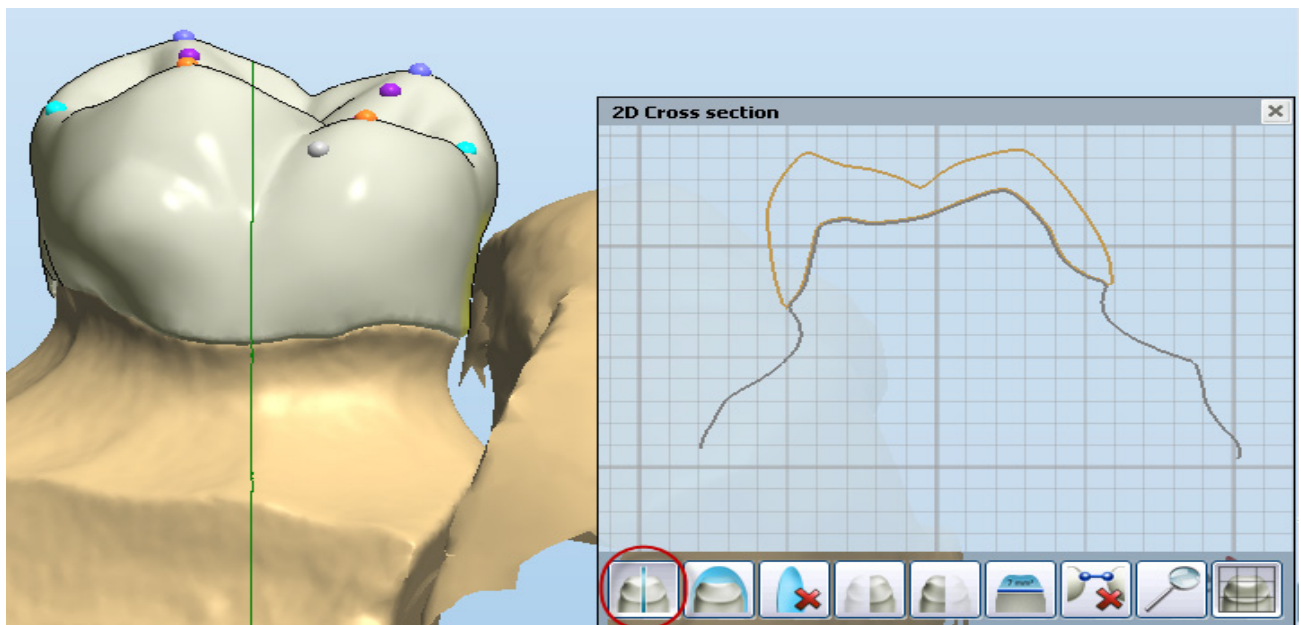
The *2D Cross-section* window allows better inspection of the dental models. 2D cross-sections can be specified either by placing three points on a 3D model, dragging a section line while holding down the left mouse button and moving the cursor across the model or with the **Parallel/Perpendicular View** buttons in the 2D Cross-Section window.

To use the cross-section window, click the **2D Cross Section**

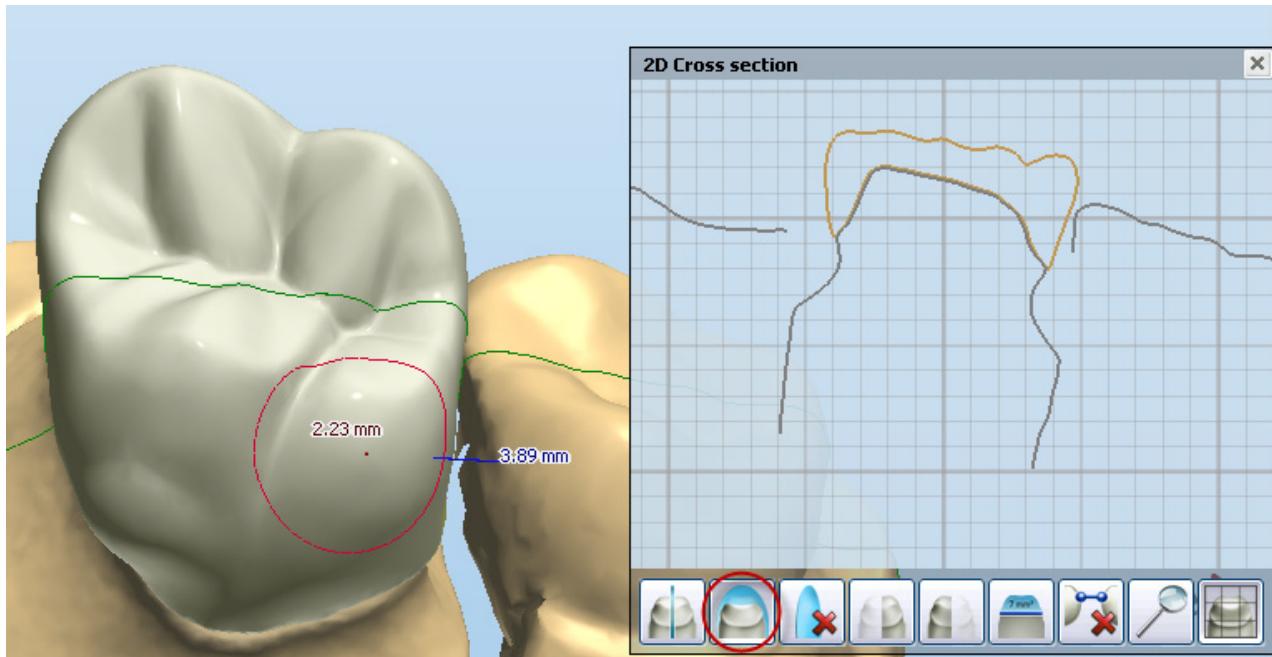


button in the Visualization toolbar in order to open the 2D Cross Section window. The window contains buttons with the functionality shown in the table to the left.

Parallel View - example is shown below:

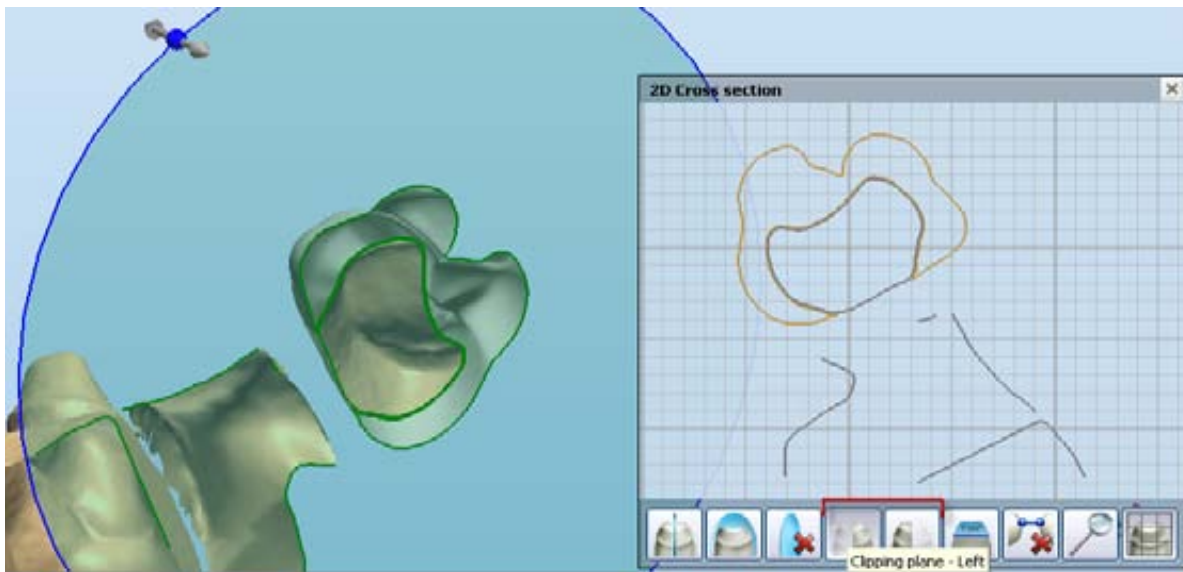


Perpendicular View - example is shown below:

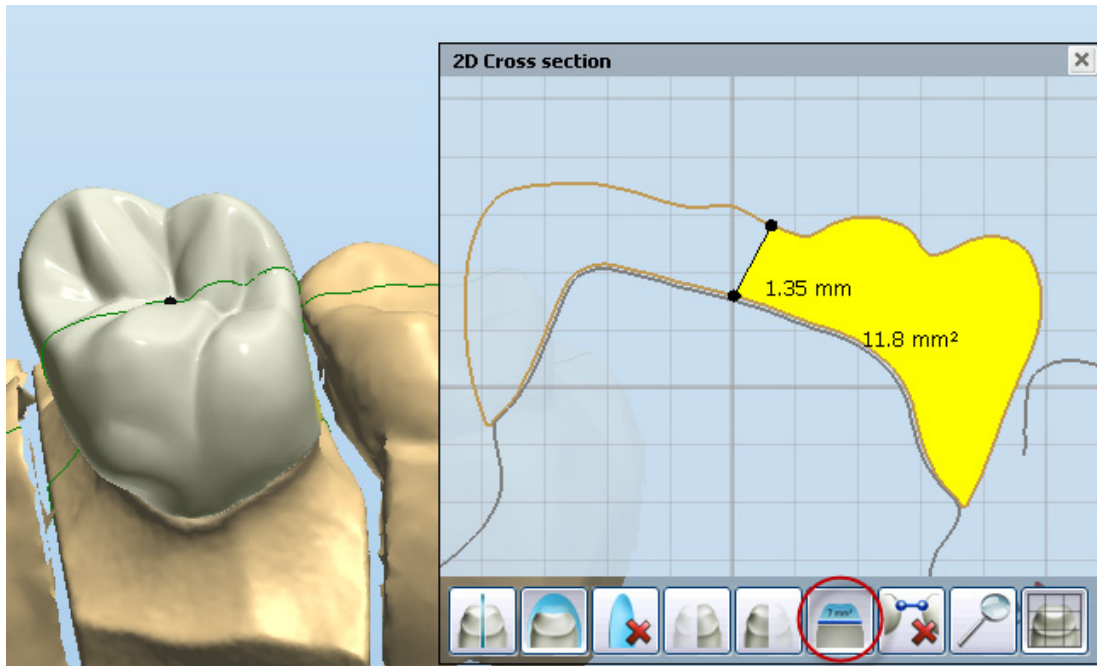


Clear View - the button clears image from the 2D Cross Section window.

Left/Right Clipping Planes - buttons allow to hide one of the cut halves, example is shown below:



Measure area - measures the specified area and distance.



Clear Measurement - removes any measurements from the 2D Cross Section window.

Zoom All - returns zoomed in/out view to its original scale.

Grid - shows/hides the grid in 2D Cross Section window.

5.4.2 Distance Measurements

The distance measurement tools are simple and effective instruments providing you with different distance measurements on the screen. These tools are located in the Main toolbar as shown on the following images.

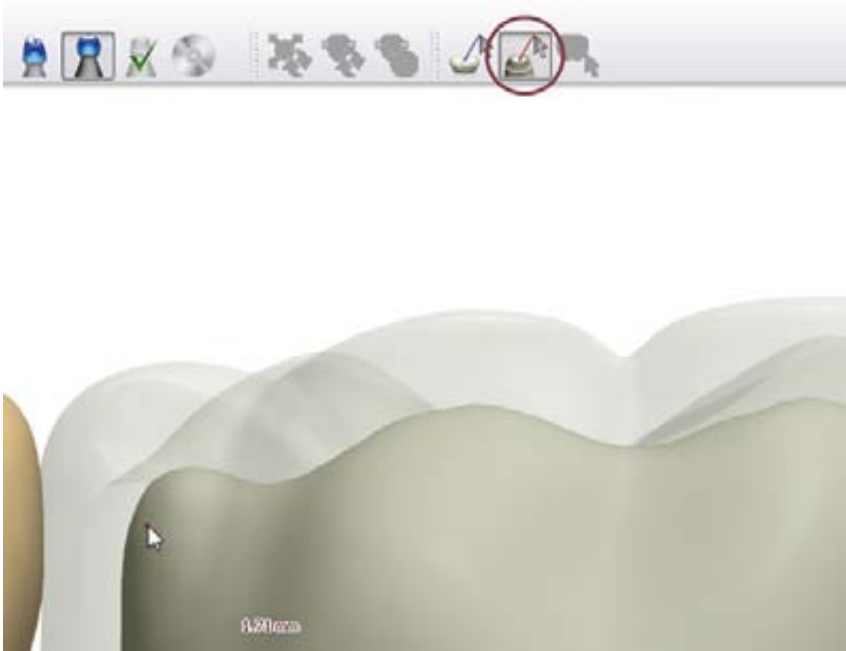
The three types of distance measurements are as follows: Distance to Adjacent, Distance to Preparation Scan and Distance to Antagonist Scan.

In order to work with the measurements, click the button for the required type of measurement and indicate the point of interest with the cursor. All three types of measurements can be enabled at the same time and distinguished by the measurement color. The illustrations of measurements given below are self-explanatory.

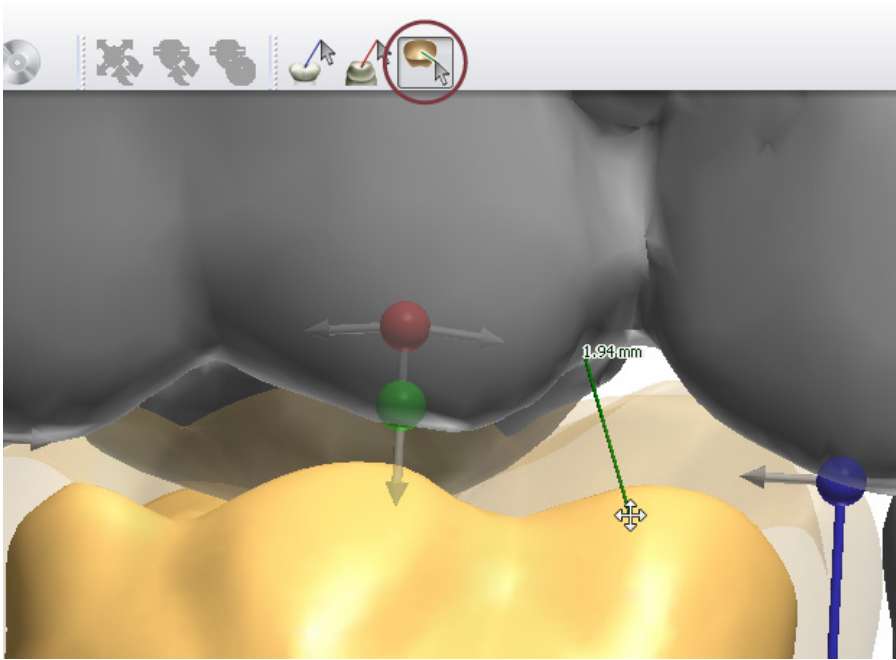
Distance to Adjacent (colored blue)



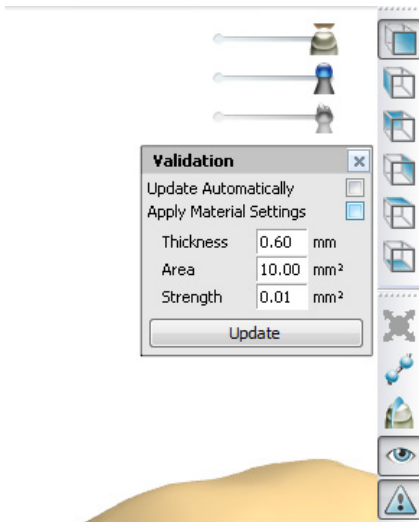
Distance to Preparation Scan (colored red)




Distance to Antagonist Scan (colored green)



5.4.3 Validation



The **Validation** function tests the restoration model against the values pre-set in Dental System Control Panel *Material Settings* section or defined manually in the *Validation* dialog, and marks the areas needing attention with red exclamation marks, whereas successfully validated parameters are marked with green ticks. Click on the exclamation mark to get a description of a problem.


In order to run the validation process, click **Validation**  button in the Visualization toolbar of DentalDesigner to compare the model values with the predefined ones. The *Validation* dialog box appears in the right upper corner of the modelling window (see image to the left).

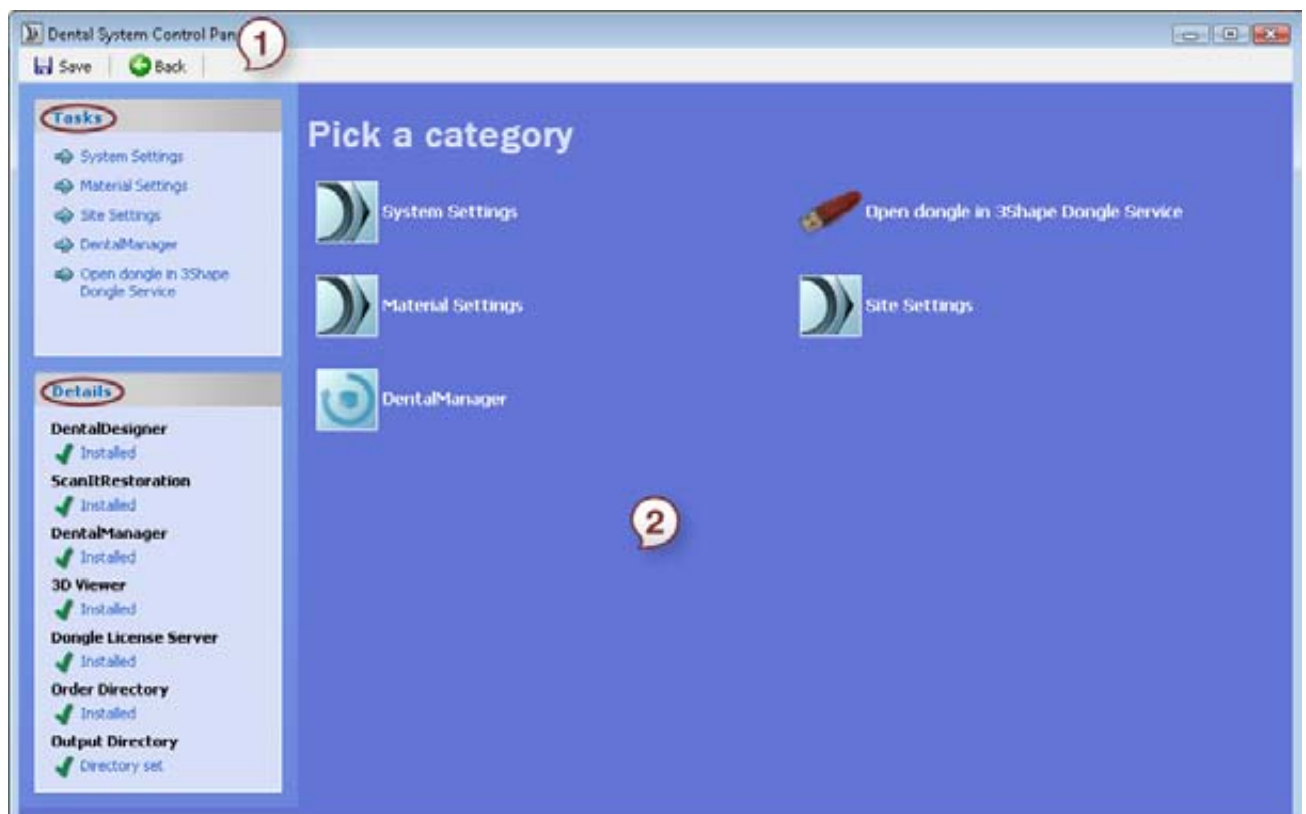
The Validation parameters (*Thickness*, *Area*, *Strength*) can be set to match your particular case. Click **Update** to update each time the parameters are changed unless **Update Automatically** check-box is selected.

Select **Apply Material Settings** check-box to apply the material settings from Dental System Control Panel.

Dental System Control Panel

3Shape Dental System Control Panel is an application that enables you to customize the necessary settings to get a fully satisfying performance from the 3Shape Dental System applications.

Dental System Control Panel is started by double-clicking the corresponding icon  either from DentalManager or from the desktop. The image below illustrates the main window of Dental System Control Panel and its categories:





1. Main toolbar
2. Main window

The *Main window* contains five categories:

- **System Settings**
- **Material Settings**
- **Site Settings**
- **DentalManager**
- **Open dongle in 3Shape Dongle Service**

Choose the one you need by left-clicking on it (it will open up and display the necessary settings). The categories are described in details in the following chapters.

The *Main toolbar* contains **Save** and **Back** buttons and **Navigation** link, that shows the current level and allows easy

entry to the higher level with a click:   Navigation: **Home** ▶ **Dental Manager**

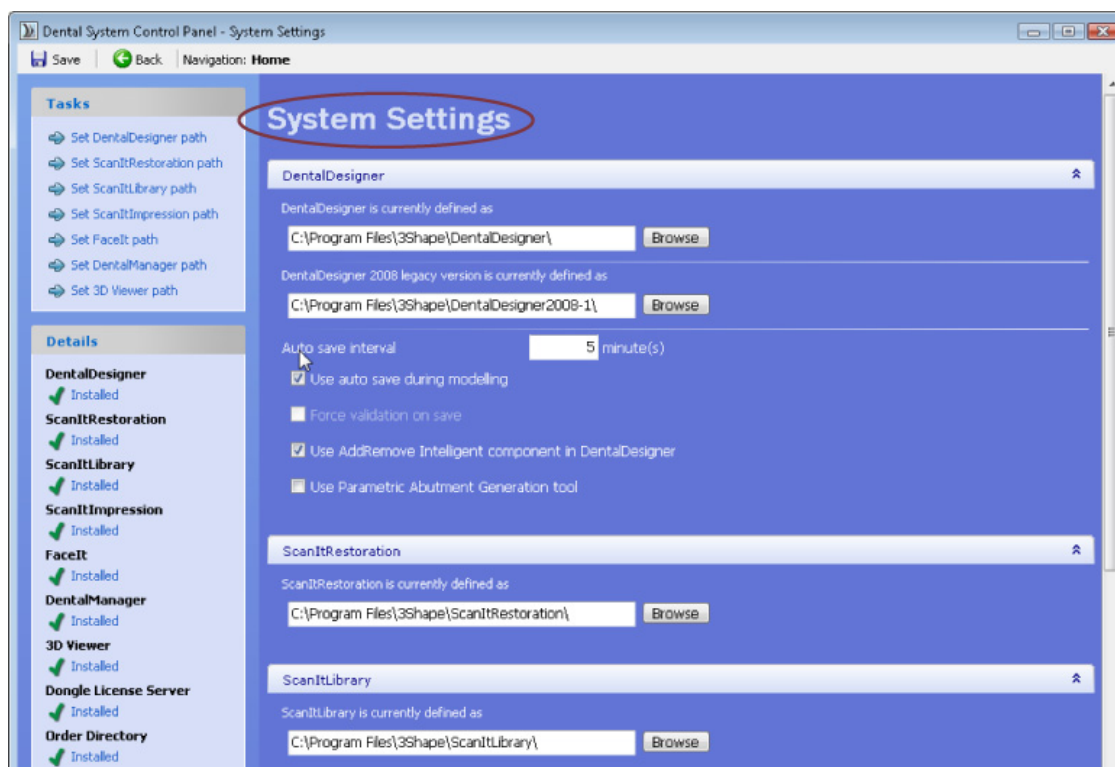
The *Tasks* tab displays a summary of options and categories located in the Main window.

The *Details* tab shows the installed applications (if there is a red cross instead of a green check-mark next to it, the application was not correctly recognized).

6.1 System Settings



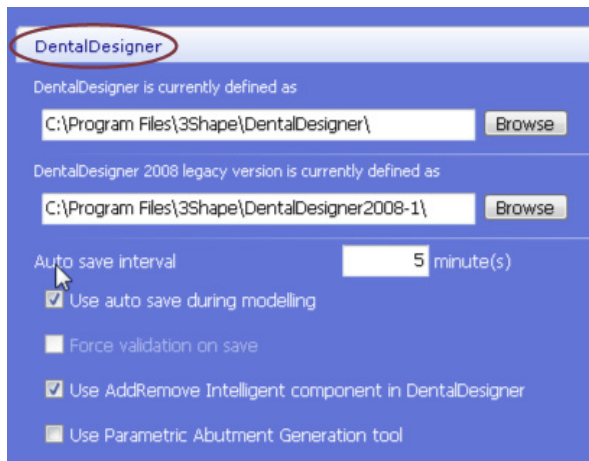
When the *System Settings* configuration screen is accessed, you can set-up the main information sources of the application. The image below illustrates the main window of this category (more settings are available when scrolled down):



Before Dental System applications can be run it is mandatory to verify locations for DentalDesigner, ScanItRestoration, DentalManager, 3Shape Dongle Service and the location of the orders and output directories. Many of these settings will have meaningful values from the installation/upgrade of the Dental System.

If 3Shape Dental System is installed as a shared system at the site then it is only possible to choose shared network folders for the different applications and output directories.

DentalDesigner



To allow Dental System Control Panel to communicate with DentalDesigner, the location of DentalDesigner must be known by Dental System Control Panel.

The location is usually correctly specified, but if changes are required, click on the **Browse** button to open up a file-tree and locate the application in its installation directory.

The DentalDesigner tab should now have correctly set location if the step was completed successfully.

To enable automatic saving of the open order, check the **Use auto save during modelling** check box and specify saving intervals.

If the **Force validation on save** check box is checked then DentalDesigner forces the *Validation* form to be shown at the end of the modelling in order to verify that the specified parameters (coping thickness etc.) are satisfied.

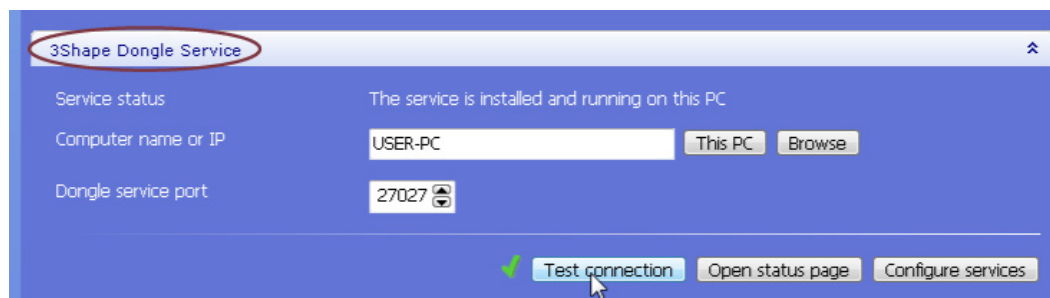
The **AddRemove Intelligent Component** checkbox is selected by default allowing the use of the advanced Add/Remove function in DentalDesigner. The improvements concern the revised processing algorithm and increased speed.

Select the **Use Parametric Abutment Generation tool** to activate the new abutment tool in DentalDesigner (see *Customized Abutments* chapter for more details).

- **ScanItRestoration**
- **ScanItLibrary**
- **ScanItImpression**
- **DentalManager**
- **3D Viewer**

The locations for these applications are specified the same way as for DentalDesigner (see above).

3Shape Dongle Service



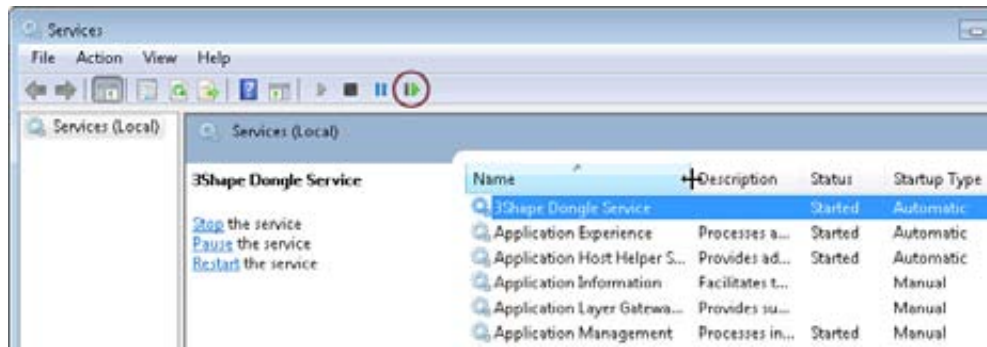
The location of 3Shape Dongle Service can be defined in different ways. It can be manually typed in, it can be defined by clicking **This PC** button (if Dental System Control Panel is started from the PC where 3Shape Dongle Service is installed) or you can click on the **Browse** button to open up a file-tree and locate the Dongle Service.

The **Dongle service port** specifies the network port used by the service. If this port needs to be changed (e.g. due to a Firewall or if another application is already using this port) it can be changed here, and at the same time it needs to be manually changed in a configuration (xml-)file located with the service.

When 3Shape Dongle Service is located and the port specified the connection can be tested by pressing the **Test connection** button. If the connection is successful a green check-mark is shown, otherwise an informative error message appears.

The **Open status page** button opens a status page that provides fast and easy overview of the licenses available on the system. It shows the number of licenses (points) available for different applications, the number of licenses currently in use and which systems are using the licenses. It is also possible to check for dongle updates from within this page and the log file for 3Shape Dongle Service can be displayed. The log file is a useful debug tool in case the Dongle Service does not respond as expected.

If 3Shape Dongle Service for some reason needs to be restarted the **Configure services** button takes you directly to the Windows Services, where 3Shape Dongle Service can be restarted as shown below:



Data Output Directories



In 3Shape Dental System the order data and the production data are placed in two separate locations. The order data folder for a specific order will only contain files used internally by 3Shape Dental System applications, whereas the production data folder (manufacturing output) will contain the modelled files used for further processing by CAM.

The content of the production folder can be reproduced based on the content of the order folder.

The applications must know where to save orders and output models. To specify the directories to which orders and output models are saved, click the **Browse** buttons to open up a file-tree and choose directories.

The order directory must be a shared network folder if a shared installation is made. You must have write access to both the order data directory and the production data directory.

The corresponding check-boxes provide the possibility to organize the location of the manufacturing output files in different ways. The **Save DentalDesigner manufacturing output to separate directory** checkbox specifies whether the manufacturing files should be placed in a sub-folder named according to the order file or if the manufacturing files for all orders should all be placed in the same output folder.

The **Save DentalDesigner manufacturing output to material named subdirectories** checkbox gives the possibility to place all manufacturing files inside a folder named according to the selected material.

Order Form Settings

Order Form settings

Check items to be visible and / or enabled in the order form

	Visible	Enabled
Lab information	<input checked="" type="checkbox"/>	
Lab operator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Client information	<input checked="" type="checkbox"/>	
Client	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Contact person	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Creation date	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Delivery date	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Shipping date	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Receive date	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Clinic order no	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Delivery type	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ship to different address	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Patient information	<input checked="" type="checkbox"/>	
Last name	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
First name	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reference	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Comments	<input checked="" type="checkbox"/>	
Order settings	<input checked="" type="checkbox"/>	
Order number	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
External order number	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Order importance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

In the Order Form Settings, you can decide what information should be visible or editable in the Order Form and define order identification (naming) template.

For each information item you click the **Visible** check box to make the information visible on the Order Form and the **Enabled** check box to make it editable through the Order Form. If a whole group of information (e.g. Lab information) is set to non-visible, the information items in that group (i.e. Lab operator) will all be invisible in the Order Form.



Note! Some check boxes are disabled. These are mandatory and cannot be changed.

You can also define a naming template for the identification of each order. This identification will be the name of both the order data folder and the production data folder. The template consists of up to 8 fields, each specifying a substring in the name in the chosen sequential order. Please see chapter *Order Settings* for more information.

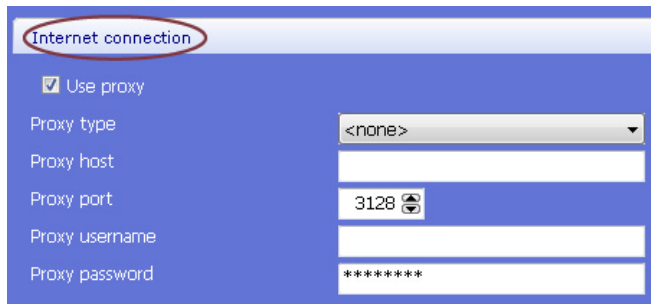
If **Use internal ID for order-ID generation** is checked, then the **SiteID** may be chosen differently from the actual **SiteID**.

Define template for order-ID generation

Use internal ID for order-ID generation ☒

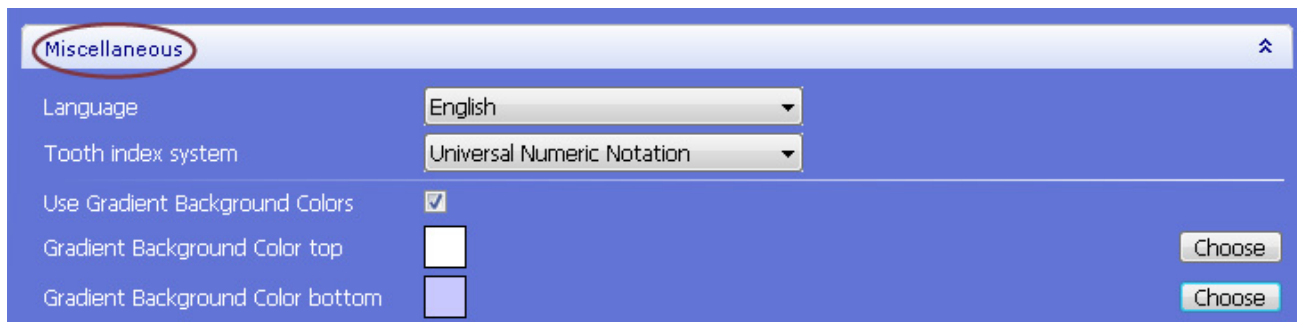
Order-ID template field 1:	SiteId	using	All characters	where spacing string
Order-ID template field 2:	Date	using	All characters	where spacing string
Order-ID template field 3:	Time	using	All characters	where spacing string
Order-ID template field 4:	Operator	using	All characters	where spacing string
Order-ID template field 5:	Dentist	using	All characters	where spacing string
Order-ID template field 6:	Patient last name	using	All characters	where spacing string
Order-ID template field 7:	Unspecified	using	All characters	where spacing string
Order-ID template field 8:	Unspecified	using	All characters	where spacing string
Order-ID template field 9:	Unspecified	using	All characters	where spacing string
Order-ID template field 10:	Unspecified	using	All characters	where spacing string
Order-ID template field 11:	Unspecified	using	All characters	where spacing string

Internet Connection



If a proxy server is used at the current site (the **Use proxy** check-box is selected) then you should specify the proxy settings in the corresponding fields.

Miscellaneous



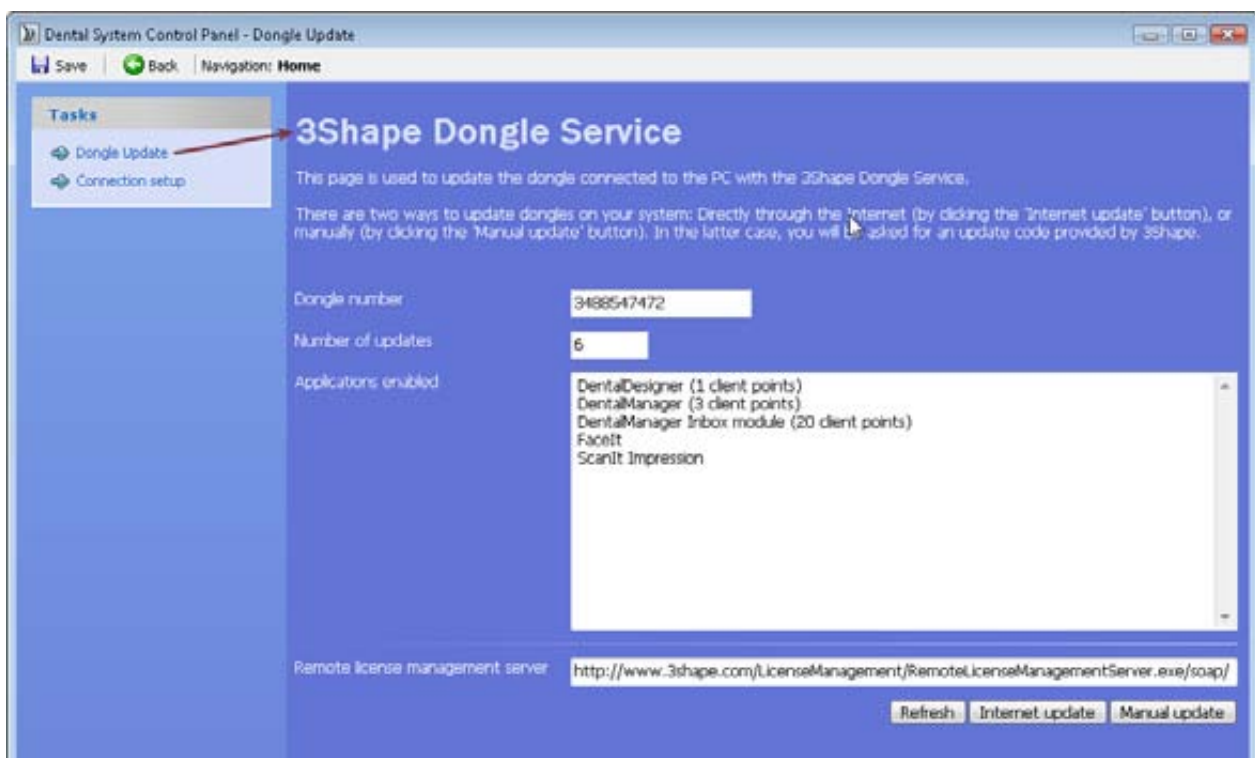
In the **Language** combo-box you can choose between the available languages for all applications. This selection will also affect which user manual is opened to the user.

In the **Tooth index system** combo-box, you can specify the type of notation to be displayed in all applications in the Dental System.

The **Background Color** allows you to define the background color in ScanItRestoration and DentalDesigner.

6.2 3Shape Dongle Service

Select *Open dongle in 3Shape Dongle Service* link in the main Control Panel window to open the page with the *Dongle Update* and *Connection Setup* options as shown on the image.



The window indicates inserted *Dongle Number*, *Number of Updates*, *Applications Enabled* and *Remote License Management Server URL*.

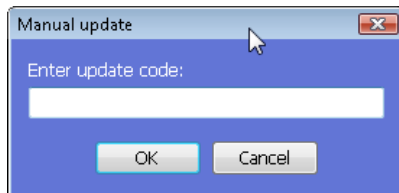
When Dental System application is opened, the 3Shape Dongle Service allocates one client point for it, and when the application is closed the license is freed once again. The client point information is also available in the status page (the status page shows additional information e.g., how many points are currently in use).

Dongle Update

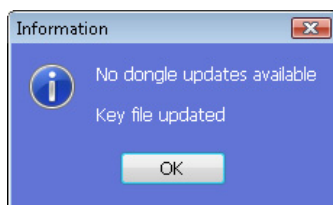
The link is used to update dongle inserted in a host computer. Only one dongle should be connected to a computer at any time.

When the dongle is replaced with another one, its information can be updated with the **Refresh** key.

Dongle update can be done either manually or via the internet by clicking the corresponding buttons. The default **Remote license management server** URL should not be modified unless instructed by 3Shape representative. Please refer to the **Internet Connection** settings if a proxy server is in use at the server's side.



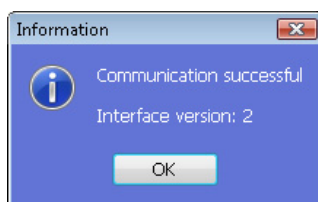
For the manual update you supply your dongle number to 3Shape representative and receive a dongle update code that you need to fill in the **Manual Update** form, then click **OK** button. The dongle is updated if with the correct code.



For the Internet update option you simply need to click the corresponding button to have the dongle updated when update is available. "No dongle update" message appears if no updates are available.

Connection Setup

The default license update *Server URL* can be viewed and tested in the *Connection Setup* window.



Click **Test Connection** button to verify connection to the server. "Communication Successful" message appears on confirmation of the test.

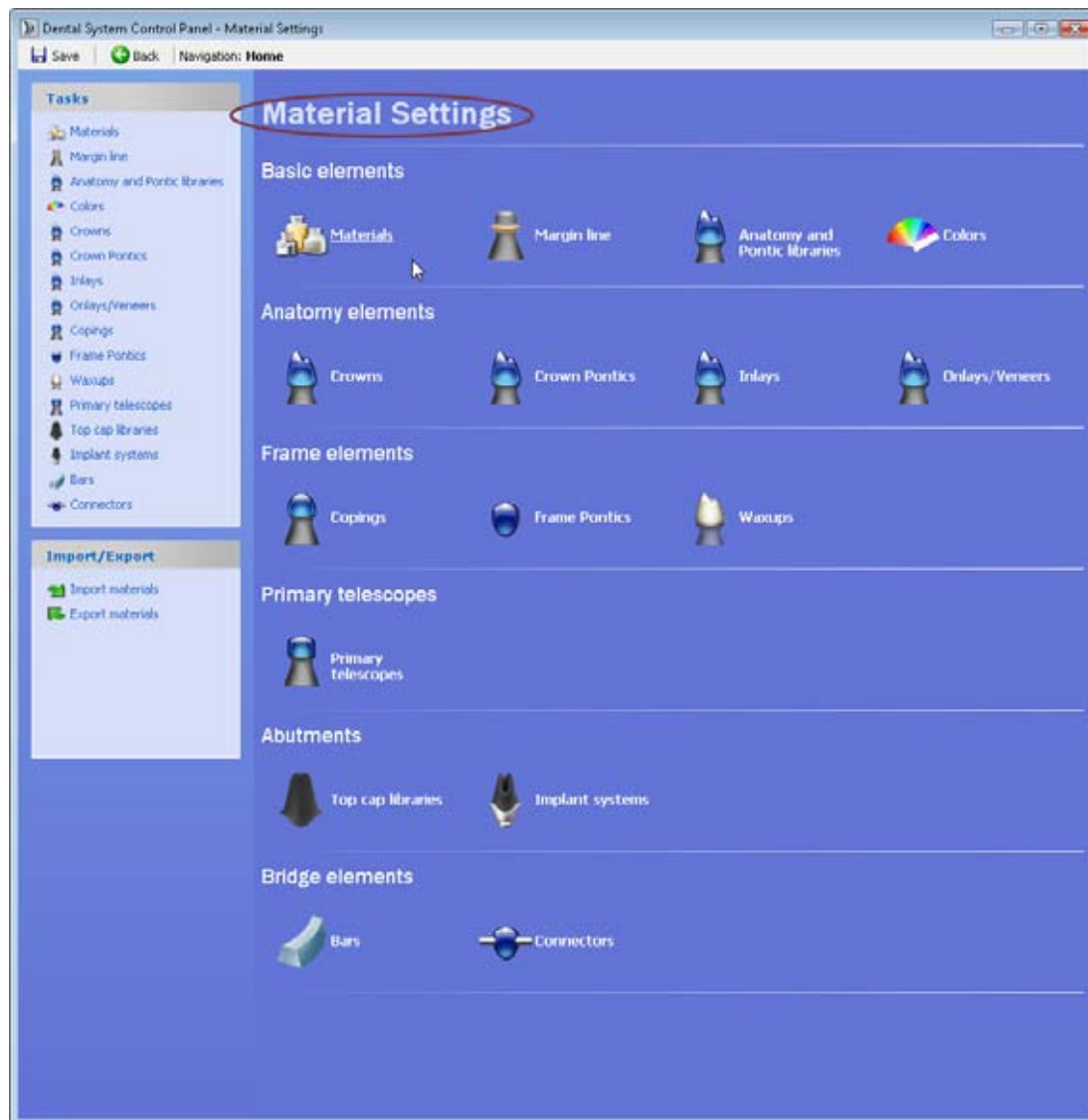
6.3 Material Settings



In the *Material Settings* you can customize administrative information and settings for the shape and type of construction elements, available through the applications in Dental System. The customized settings ensure that the same data is used and kept unchanged in the Dental System applications.

In this way you save time working in DentalDesigner, as values of the construction elements are loaded once and don't have to be typed in again.

The image illustrates the main window of this category:



The Material Settings category displays 6 subcategories, which are described in the sections further:

- Basic Elements
- Anatomy Elements
- Frame Elements
- Primary Telescopes
- Abutments
- Bridge Elements

6.3.1 Basic Elements

This category contains the settings for the basic elements of the applications, such as materials, libraries etc.



Materials

Here you can specify and edit materials, which are to be used in the construction elements. The Materials interface is illustrated in the image:

You can edit the material, performing the following operations:

	Add - add a new material to the <i>Material</i> list (as illustrated above: Zirkon, Titan, Wax). When adding a new item a unique ID will automatically be provided, and you must then provide meaningful information such as Name etc.
	Copy - copies the currently selected item (highlighted in the list). In general, all data with the exception of the ID and Name is copied to the new element, but there can be exceptions.
	Delete - deletes the currently selected item. This does not delete the item immediately – it is deactivated instead and placed in the Recycle bin , where it can be finally deleted or restored back to the <i>Material</i> list.
	Move up/down - moves the currently selected item one place up or down in the list.

To change the item's ID, click **Change ID** button and select a new ID (an identification unique among all items).

The **Name** is a regular text string (not necessary unique) that acts as the “visual” identification of an item – wherever the item appears in Dental System applications, it will be identified by its name.

Each material item may have an **External ID** which is used when interfacing with third parties, e.g. a central manufacturing site.

An optional **Shader material** may be chosen for improved visualization of the construction elements in DentalDesigner.

Default scan module - lets you use choose the application to be used for scanning: ScanItImpression 2009 or ScanItRestoration 2009. Choose **Use 3Shape Default** to use the default application.

Default design module - lets you choose the application to be used for modelling: DentalDesigner 2009 or DentalDesigner 2008. This option provides the possibility to use the well-known DentalDesigner 2008 version, but naturally it is recommended to use the 2009 version as this version is much improved in many ways (with regards to new functionality as well as user friendliness). Choose **Use 3Shape Default** to use the default application.

The **Use colors** check-box, when selected, allows you to choose colors for your restoration in the Order from.

Validation enforcement policy can be very helpful during the modelling process pointing and/or improving some of the violations of minimal parameters (e.g. wall thickness). You can choose here one of the four options: *No enforcement*, *User can choose to ignore violations*, *Always enforce but notify the user first*, *Always enforce without notifying the user*.

Specify the parameters for **Minimum wall thickness**, **connector area** and **strength** (active when the corresponding check-box is selected).

Margin Line

Specify here the default settings for detecting the margin line:

Point distance - defines the distance between neighboring points on the margin line.



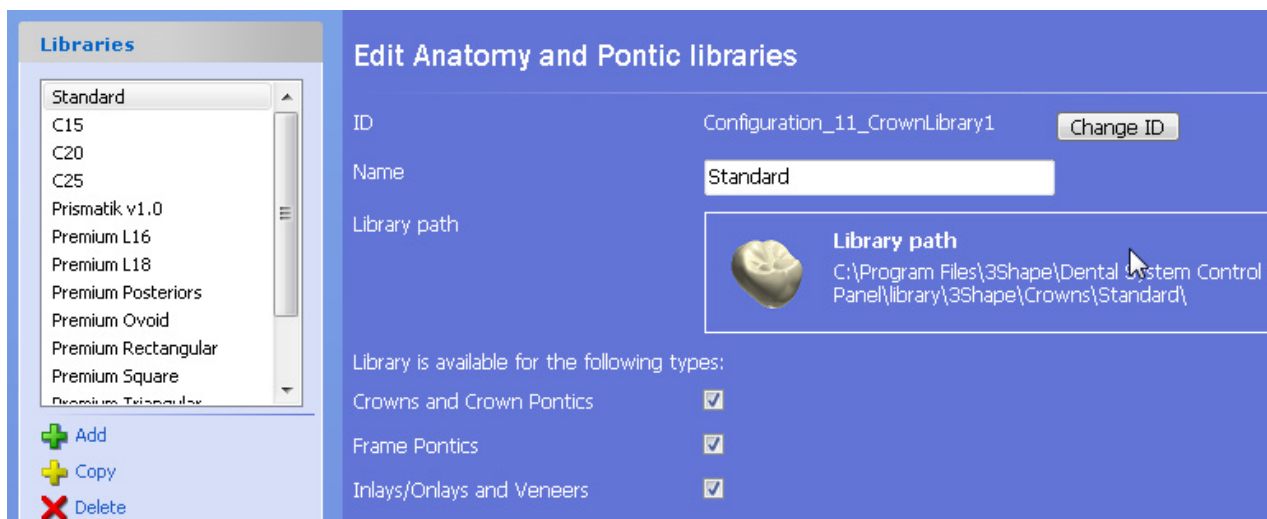
Angle - defines the angle used for automatic detection of the margin line. Increasing this angle will make the automatically detected margin line "crawl up" on the die and vice versa for decreasing it.

Maintain angle - used for automatic detection of the margin line. Low values will place the automatically detected margin line on surface extrema (i.e. sharp edges) while high values will place the automatically detected margin line where the **Angle** criterium is fulfilled.

Smoothing - a postprocessing step in the automatic detection scheme; high values apply significant smoothing to the automatically detected margin line (making it appear very aesthetically pleasing but less accurate) and vice versa for low values.

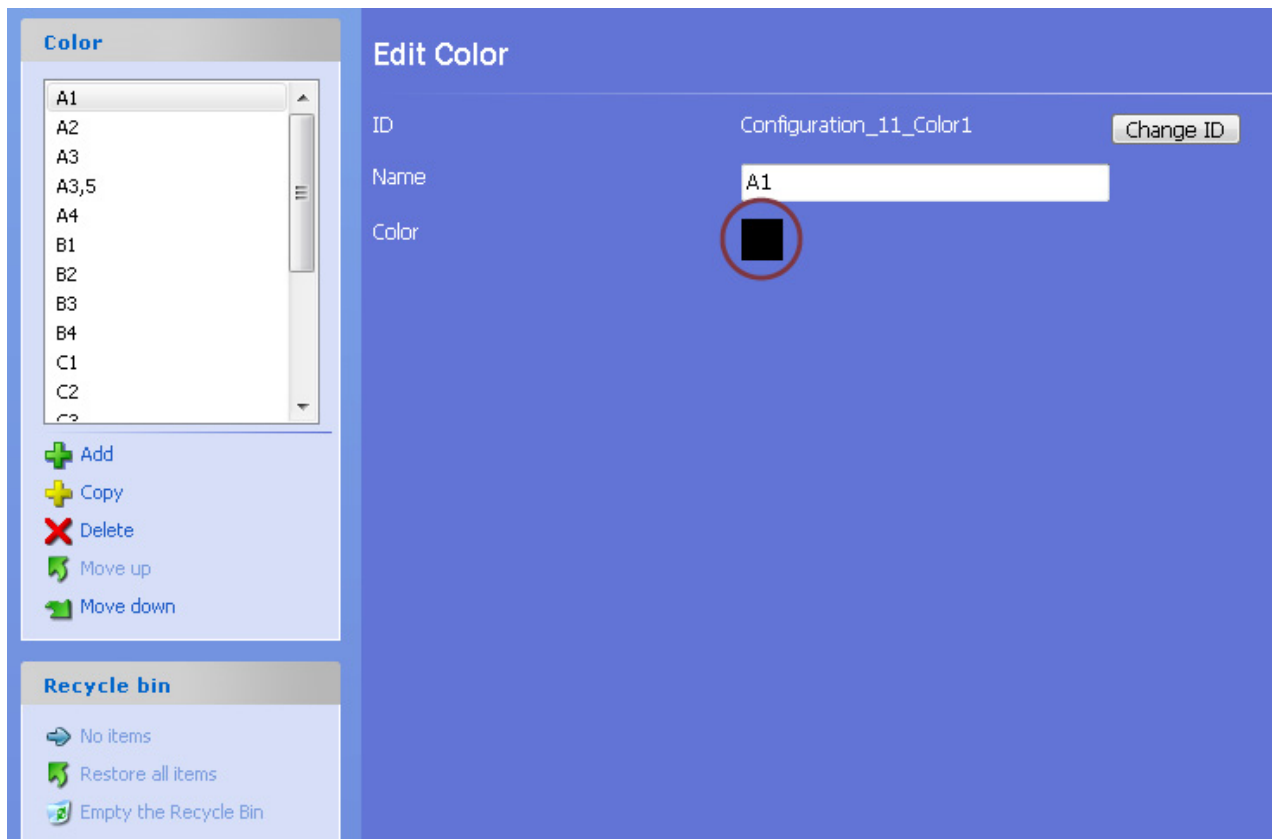
Anatomy and Pontic Libraries

You can specify here a collection of pontics and crowns to be used as construction elements.



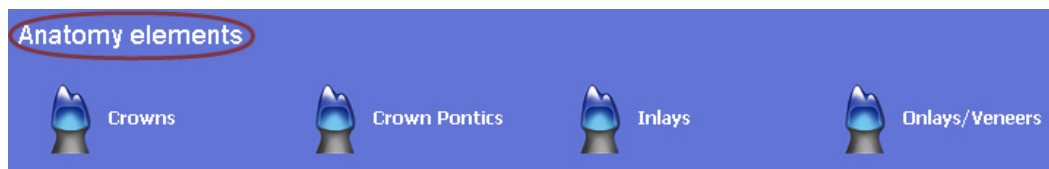
Library path - is a link to the folder containing a set of crown and pontic models (in stl or dcm formats). Click on the path name (see the image above) to specify a new path. You can also Add/Copy/Delete libraries and make them available/unavailable for some types of restorations (see the check-boxes in the image above).

Colors - The color of restoration material can be defined here. You can add/copy/delete colors and modify them at any time.



6.3.2 Anatomy Elements

The **Anatomy elements** category contains the settings for defining the anatomical items, which form the outer appearance of a tooth. Four subcategories are presented here: **Crowns**, **Crown Pontics**, **Inlays** and **Onlays/Veneers**.



Their settings are similar - each subcategory consists of three tabs: **Edit** (Crown, Crown Pontic, Inlays or Onlays/Veneers), **Cement space** and **Overlay** (the **Overlay** tab is different for Inlays/Onlays/Veneers - see below).

The example below illustrates **Crowns** subcategory and its settings:



The crowns, crown pontics, inlays and onlays/veneers can be edited here (added, copied, deleted etc. - please see chapter *Basic Elements* for more details).

Specify **Color** and **Material** (they will be reflected in the Order Form).

Default library name - is the name of the crown (crown pontic / inlays/ onlays/ veneers) library as it will be displayed in the Order Form.

Cement space	
Name	Wax->Gold Crown (tangent)
Remove undercuts	<input checked="" type="checkbox"/>
Cement gap	0.040 mm
Extra cement gap	0.080 mm
Distance to preparation line	1.20 mm
Smooth distance	0.30 mm

The **Cement Space** tab contains data for specifying the inner surface of an item.

Remove undercuts - when checked, the undercuts are removed when creating the cement space.

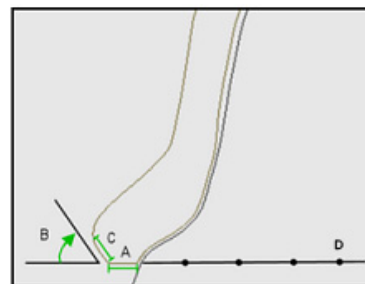
Please see *Die Interface* section of the Single Coping chapter for information on **Cement gap**, **Extra cement gap**, **Distance to preparation line** and **Smooth distance**.

Overlay	
Name	Wax->Gold Crown (tangent)
Wall thickness	0.45 mm
Preparation line offset	0.08 mm
Offset angle	55 °
Extension offset	0.06 mm
Edge design lingual offset	0.20 mm
Edge design facial offset	0.20 mm
Edge design interprox1 offset	0.20 mm
Edge design interprox2 offset	0.20 mm
Crown degrading	0 degree
Perform cutting to antagonist	<input type="checkbox"/>
Cut distance to antagonist	0.00 mm

The **Overlay** tab contains data for specifying the general outer surface of an item.

Wall thickness - is the distance between the outer overlay and inner (cement space) surface.

Preparation line offset, **Offset angle** and **Extension offset** are illustrated below:



- A. Margin line offset
- B. Offset angle
- C. Extension offset
- D. Margin line

Edge design lingual offset
Edge design facial offset
Edge design interprox1 offset
Edge design interprox2 offset

These are the settings for specifying the distance from the margin line from which you cut back the anatomical crown.

Crown degrading - is the default value for degrading of the library crown. Zero signifies no degrading of the library crown.

Select the **Perform cutting to antagonist** check-box if you want the corresponding action to be performed. Specify the **Cut distance to antagonist** below.

Overlay	
Name	Wax->Gold Crown (tangent)
Wall thickness	0.45 mm
Preparation line offset	0.08 mm
Offset angle	55 °
Extension offset	0.06 mm
Edge design lingual offset	0.20 mm
Edge design facial offset	0.20 mm
Edge design interprox1 offset	0.20 mm
Edge design interprox2 offset	0.20 mm
Crown degrading	0 degree
Perform cutting to antagonist	<input type="checkbox"/>
Cut distance to antagonist	0.00 mm

The Inlays/Onlays/Veneers **Overlay** tab:

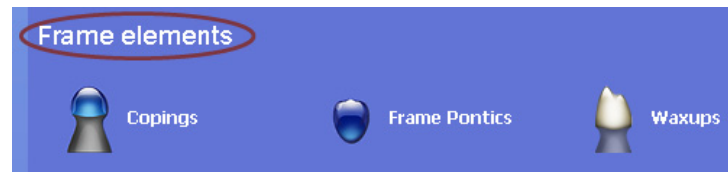
Transition distance - specifies the transition away from the preparation line where the minimum thickness is not fully applied. If a point on the inlay is further than the transition distance from the preparation line, it needs to satisfy the minimum thickness.

If it is closer, however, the minimum thickness is smaller decreasing to 0 at the preparation line allowing sharp edges.

Snap distance and **Locality radius** are used for the antagonist contact. The special points that are used for adjusting to the antagonist are not used directly, but any point within the **Locality radius** from these points can be moved to the antagonist. The **Snap distance** defines how far the point can be moved from antagonist (if closer than the snap distance, it is adjusted to the antagonist).

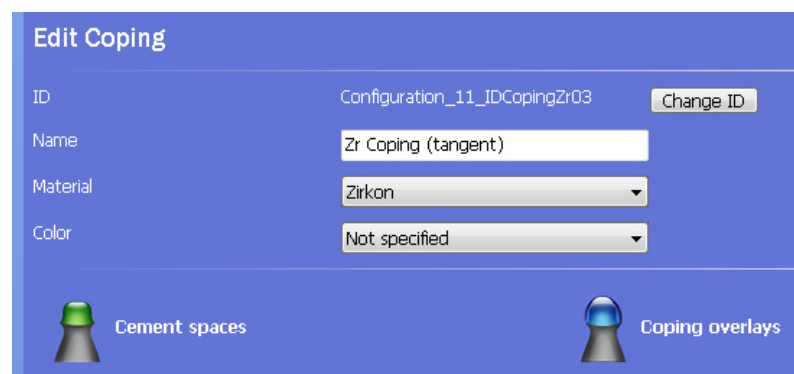
6.3.3 Frame Elements

The **Frame elements** category contains the settings for defining the framework of a restoration.



There are three subcategories presented here: **Copings**, **Frame Pontics** and **Waxup**.

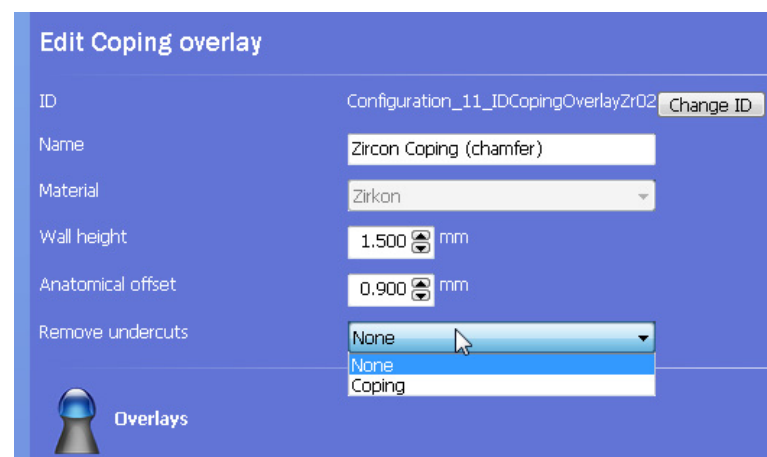
Copings



Other than **ID**, **Name**, **Material** and **Color** this subcategory contains **Cement spaces** and **Coping overlays**. Left-click on them to get the corresponding settings.

For information on **Cement spaces** please see *Anatomy Elements* chapter.

When you click on **Coping overlays** the following window opens up:

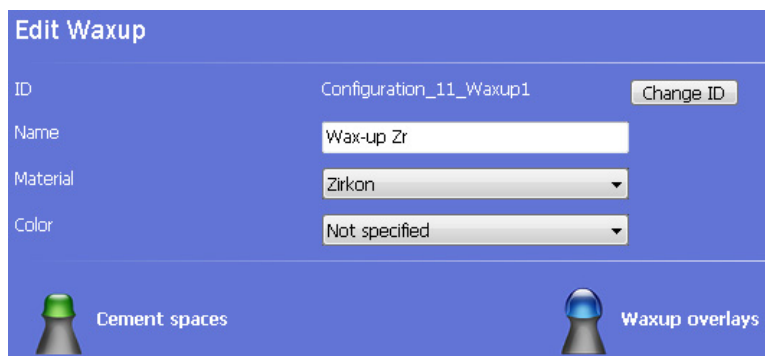


Wall height - is the distance from the margin line to the borderline marking the beginning of an area where the wall thickness is applied.

When you click on **Overlays** there appears an **Edit Overlay** window, the settings of which are described in *Coping* section of the Single Coping chapter.

Frame Pontics - The settings are the same as for the **Crowns (Edit Crown)** subcategory in the *Anatomy Elements* chapter.

Waxups



The 'Edit Waxup' window has a blue header and background. It contains the following fields: 'ID' with value 'Configuration_11_Waxup1' and a 'Change ID' button; 'Name' with value 'Wax-up Zr'; 'Material' with a dropdown menu showing 'Zirkon'; and 'Color' with a dropdown menu showing 'Not specified'. At the bottom, there are two icons: a green one labeled 'Cement spaces' and a blue one labeled 'Waxup overlays'.

This subcategory contains two tabs: **Cement spaces** and **Waxup overlays**. Click on them to get the corresponding settings

The information on **Cement spaces** is located in chapter *Anatomy Elements (Cement Space)*.

When you click on **Waxup overlays** there appears a window similar to the one below:



The 'Edit Waxup overlay' window has a blue header and background. It contains the following fields: 'ID' with value 'Configuration_11_WaxupOverlay1' and a 'Change ID' button; 'Name' with value 'Waxup overlay Zr'; 'Material' with a dropdown menu showing 'Zirkon'; 'Cut offset' with a value of '2.000 mm' and a spinner icon; and 'Waxup offset' with a value of '0.000 mm' and a spinner icon. At the bottom, there is a blue icon labeled 'Overlays'.

Cut offset - is the offset distance from the margin line where the wax-up scan is cut and a smooth surface from the cut to the margin line automatically generated.

Waxup offset - is the wax-up surface offset outwards (positive) or inwards (negative).

When you click on **Overlays** (see the image to the left) *Edit Overlay* window appears described in this chapter above (in **Copings** subcategory). See also *Coping* section of the Single Coping chapter for more details.

6.3.4 Primary Telescopes



Primary telescopes category identifies the material-bound primary telescope construction element.

Click **Primary telescopes** to get the window shown on the image below:

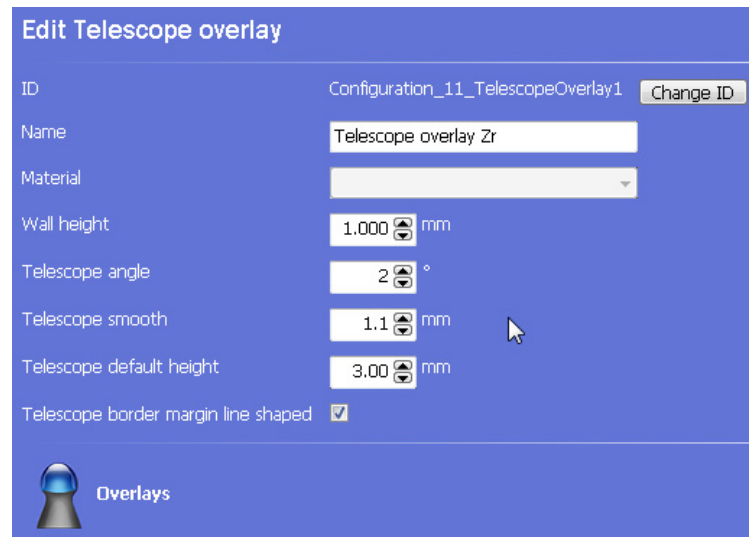


The 'Edit Primary telescope' window has a blue header and background. It contains the following fields: 'ID' with value 'Configuration_11_Telescope1' and a 'Change ID' button; 'Name' with value 'Primary telescope crown Zr'; 'Material' with a dropdown menu showing 'Zirkon'; and 'Color' with a dropdown menu showing 'Not specified'. At the bottom, there are three icons: a green one labeled 'Cement spaces', a blue one labeled 'Telescope overlays', and a red one labeled 'Optional components'.

Edit Primary telescope window contains three tabs: **Cement spaces**, **Telescope overlays** and **Optional components**.

The information on **Cement spaces** is located in *Anatomy Elements* chapter.

Click **Telescope overlays** to open the following settings:



Wall height - is the distance from the margin line to the borderline marking the beginning of the area where the wall thickness is applied.

Telescope angle - is the angle of the telescope cone, measured from the telescope direction.

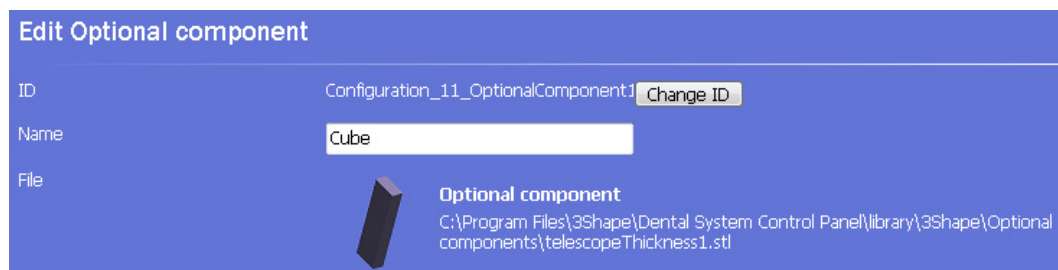
Telescope smooth - is the factor determining the smoothing of the top surface according to the underlying coping overlay surface.

Telescope default height - is the height of the telescope cone.

Telescope border margin line shaped - when checked, the telescope border (the top / upper control points) is initialized, shaped as the margin line; otherwise in a plane (i.e. flat) orthogonal to the telescope direction.

When you click **Overlays** (see the previous image), *Edit Overlay* window appears, its settings are described in *Coping* section of the Single Coping chapter.

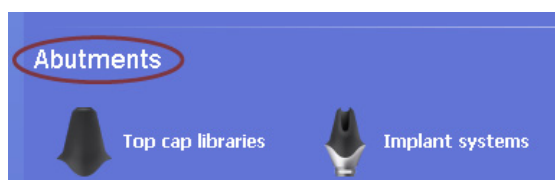
Click **Optional components** to get the following settings:



The **Optional Components** tab can only be accessed from **Primary Telescope** category, since only primary telescope construction elements can have components attached on the sides.

The **Optional Component** settings include a path to a closed model in the STL format. The default **Optional Component** item is linked to a 3Shape library component. The path can be changed with a click on the path name (see the image above) to open a file browser. It is possible to create and use customized components, but some guidelines must be followed. Please contact 3Shape for further information.

6.3.5 Abutments

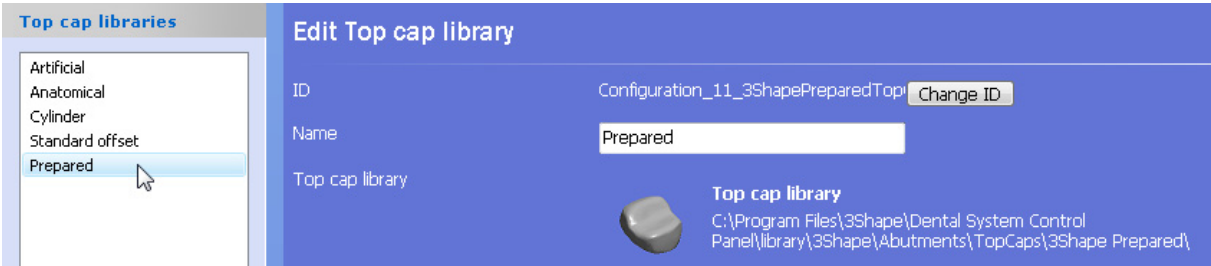


3Shape Dental System is an open system, where all kinds of implant systems can be added and used to create customized abutments.




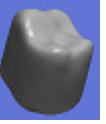

To be able to create customized abutments, a number of auxiliary CAD models must be prepared and added into the dental system.

Abutments - category contains two tabs with the corresponding settings: **Top cap libraries** and **Implant systems**.

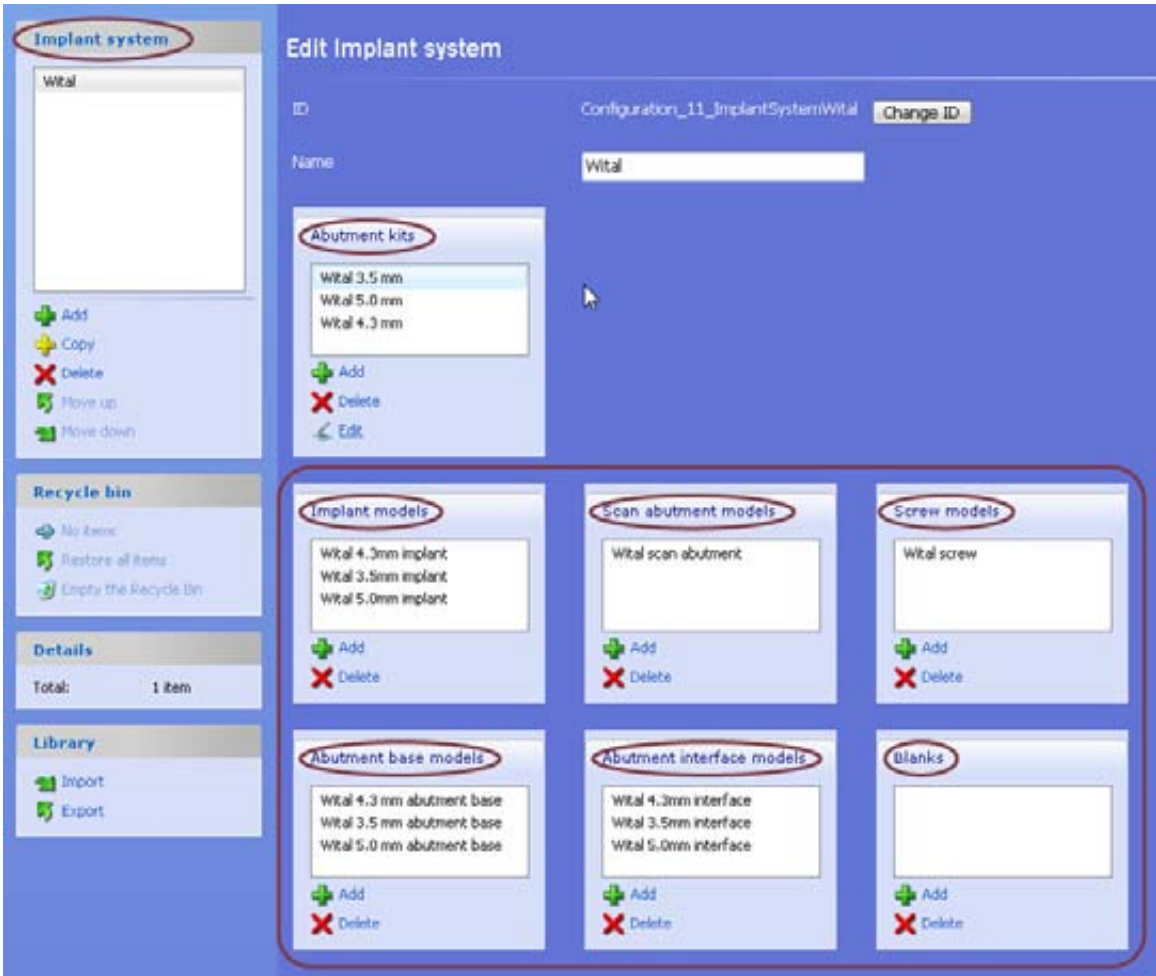
Click on **Top cap libraries** to get a window as shown on the following image:



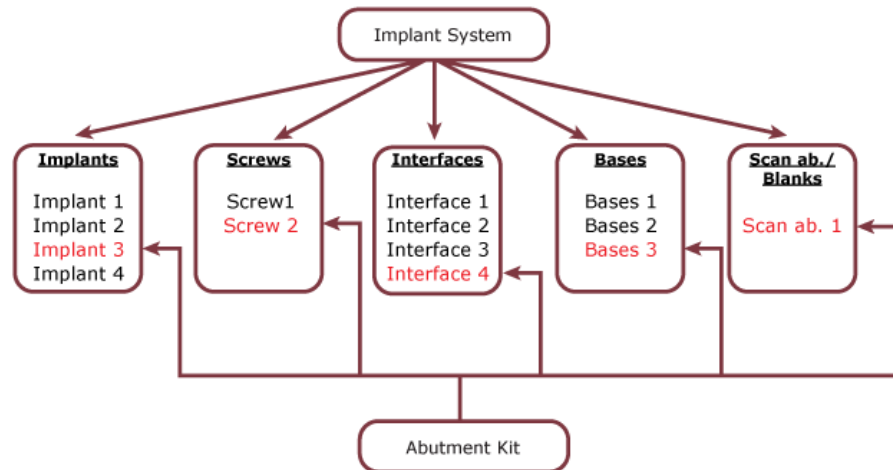
The **Top cap libraries** settings allow definition of abutment top caps used during abutment modelling. The functionality is similar to that of defining pontic libraries. Top cap libraries can be:

				
Artificial	Anatomical	Cylinder	Standard offset	Prepared

Click **Implant Systems** to start handling the implant settings:



To handle the CAD models related to customized abutments, the 3Shape Dental System deals with a number of concepts related to the grouping of these files:



- The highest level of grouping is an **Implant System** which typically corresponds to a given implant manufacturer.
- Each implant system can contain a number of parts – an implant, a screw, an interface, a base or a scan abutment/blank.
- An **Abutment kit** is a collection of parts needed to complete the design of the customized abutment. A given kit **MUST** contain exactly one implant, one scan abutment and one base and optionally also a screw and/or an interface. Abutment kits are created by referencing the models added to a given implant system. Multiple abutment kits can reference the same parts and these kits hence allow you to easily combine the various parts belonging to a given implant system.



- | | |
|--------------|------------|
| 1. Base | 3. Implant |
| 2. Interface | 4. Screw |

When creating implant models, it is important to export them in one common coordinate system. When handled in this coordinate system, the set of models should form a complete assembly – i.e. be positioned relative to each other as when they are assembled into a complete implant.



Hint! 3Shape recommends that the origin of the common coordinate system is placed on the upper resting surface of the implant and centered on the implants vertical axis.

Furthermore, the y-axis of the coordinate system should be aligned with this vertical axis and point upwards – i.e. away from the implant.

An example of correct placement is shown in the image to the left.

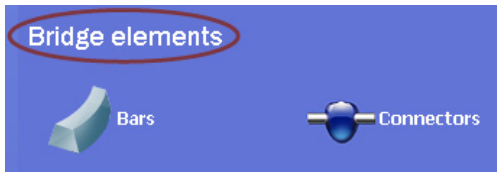
It is also possible to **import** implant systems and abutment kits using Dental System Control Panel. To configure Dental System for customized abutment design, follow the steps below:

1. Go to **Edit implant system** in Dental System Control Panel -> *Material Settings* -> *Abutments*->*Implant System* (see the main window in the image above).
2. Press the **Add** button in the **Implant Systems** group to add a new implant system and type in a unique ID and name, e.g. MyImplant.
3. Select the desired system in the **Implant Systems** group to add parts/CAD files to a given implant system. Then press **Add** in one of the desired parts' windows to browse the file (screw, base, etc.). Import all the desired parts before proceeding to the next step.
4. Click the **Add** button in *Abutment kit* window to create abutment kits from the parts of the active implant system. **Edit abutment kit** wizard will then appear to guide you through the parts selection. Follow the wizard instructions and click **Finish** when done.
5. Save changes and close Dental System Control Panel.



Note! In this wizard it is mandatory to select one implant, one scan abutment and one base. It is optional, however, to select a screw and an interface. Abutment kits without a screw will not be able to generate screw retained abutments at the design step.

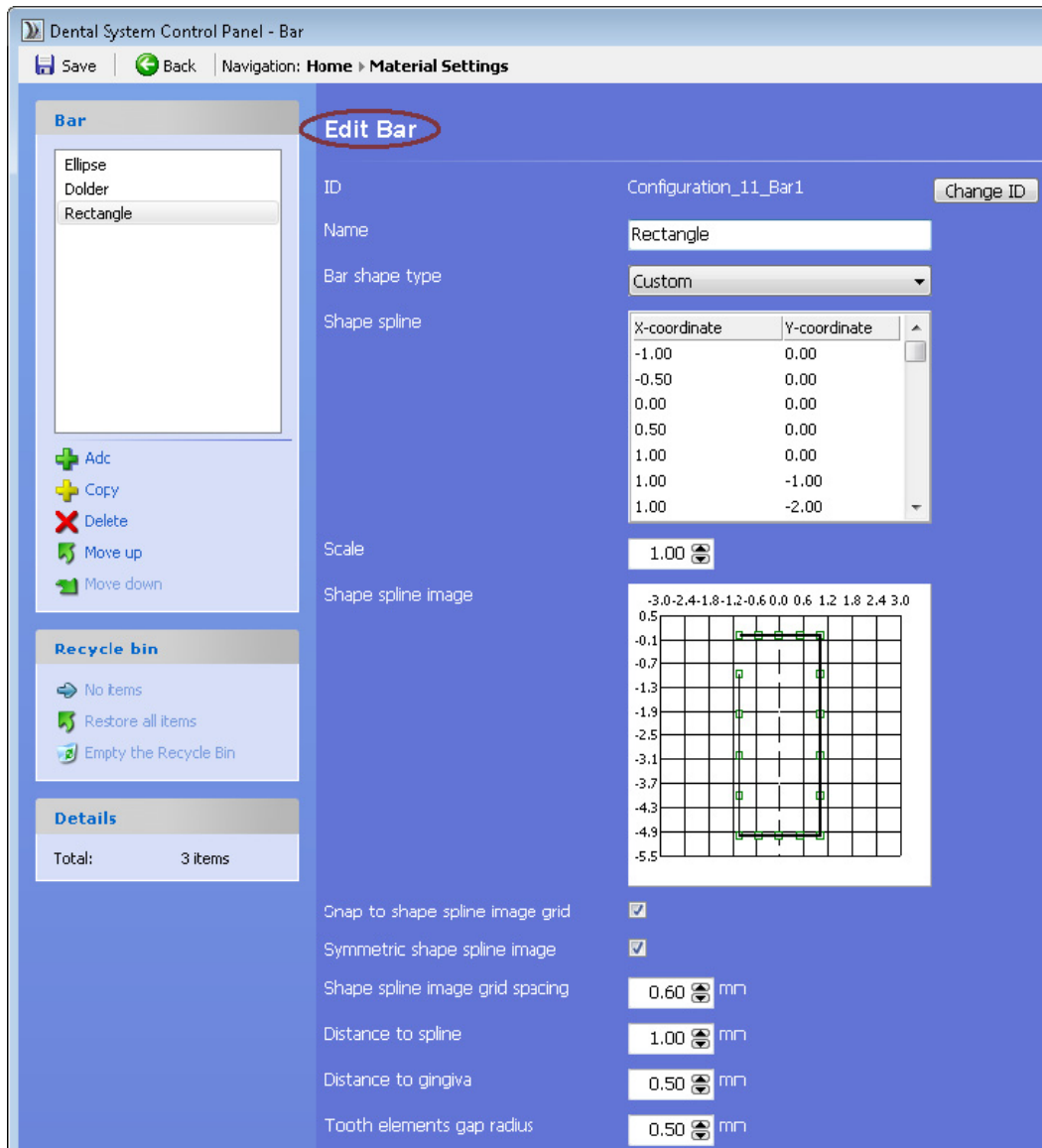
6.3.6 Bridge Elements



Bridge elements category contains two tabs: **Bars** and **Connectors**.

The **Bars** tab contains the setting for identifying a bar construction element.

The image below illustrates the main window of this tab:



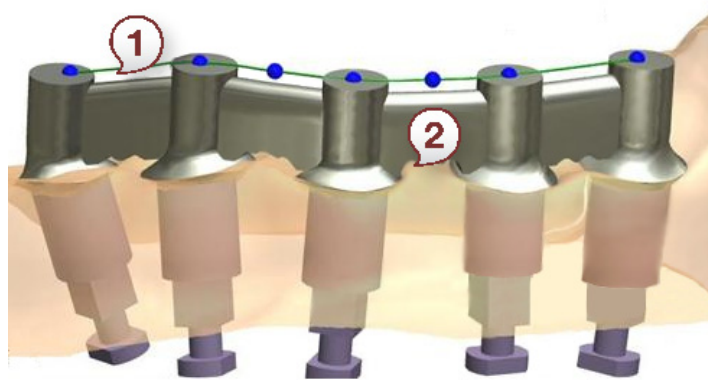
Bar shape type - is a descriptive type of a bar shape. Currently five types are supported: Custom, Circular, Elliptical, Dolder and Trapezoid. The Circular, Elliptical, Dolder and Trapezoid bar shape types provide additional settings specifying the number of points, width, height and angle of the bar. For the Custom bar shape data interface provides the possibility of both typing the coordinates in the *Shape spline* window and drawing in the **Shape spline image** grid.

Shape spline image grid spacing - defines the grid size used when drawing the bar shape.

Distance to spline - defines the distance between the placement overview spline and the top of the bar (see the image below).

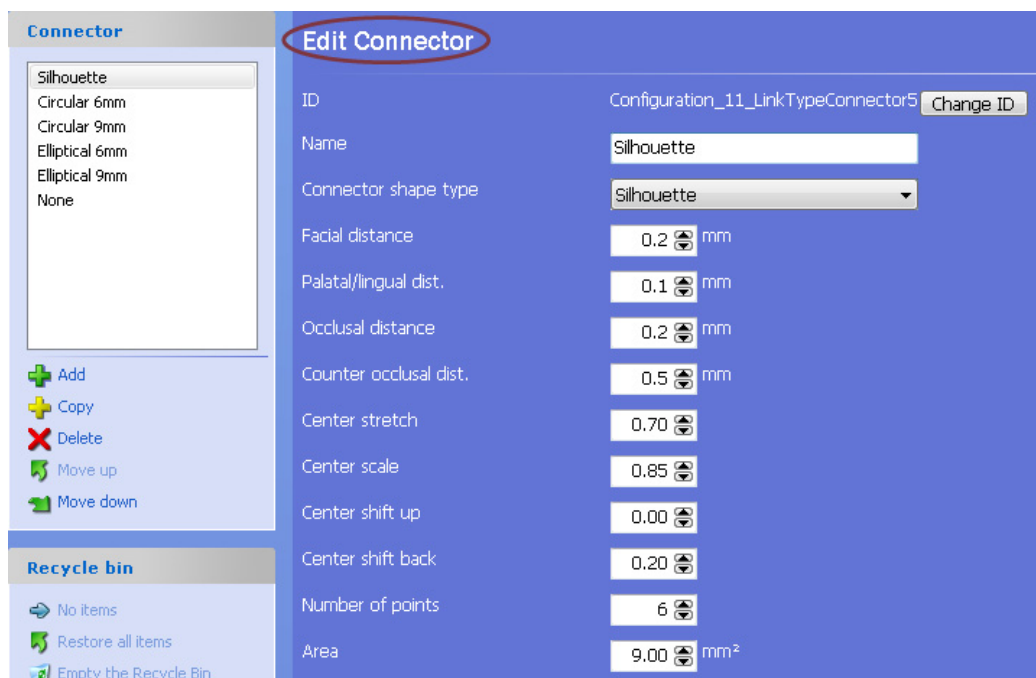
Distance to gingiva - defines the distance between the lower part of the bar and the gingiva.

Tooth elements gap radius - defines the radius of the gap at the intersection between the bar and the construction element (see the image below).



1. Distance to spline
2. Gap radius

The **Connectors** tab contains settings for defining a connector (see the image below):



Settings can differ depending on the type of connector (Silhouette, Circular or Elliptical).

- Settings common for all types of connectors are:

Connector shape type - defines the type of connector: *Silhouette*, *Circular*, *Elliptical* or *None*.

Center stretch - defines the stretching of connector.

Center scale - defines the scaling of connector.

Center shift up - defines the shifting of a central part of connector (occlusal).

Center shift back - defines the shifting of a central part of connector (facial).

Number of points - defines the number of points in the connector control splines. The default number is 6 points.

Area - defines the approximate area of the sliced connector located at the connector control splines.

- Settings specific for the Silhouette connector type:

Facial distance - the (approximate) distance from the connector control splines to the facial side.

Palatal / lingual dist. - the (approximate) distance from the connector control splines to the palatal/lingual side.

Occlusal distance - the (approximate) distance from the connector control splines to the occlusal side.

Counter occlusal dist. - the (approximate) distance from the connector control splines to the counter occlusal side.

- Settings specific for the Circular and Elliptical connector types:

Scale factor - scales the default connector control splines.

Shift back - moves the connector control splines in the lingual direction.

Distance to spline - places the center of the connector control splines a certain distance vertically from the Placement overview spline. The default value of "0" ignores the placement (named **Auto** in DentalDesigner).

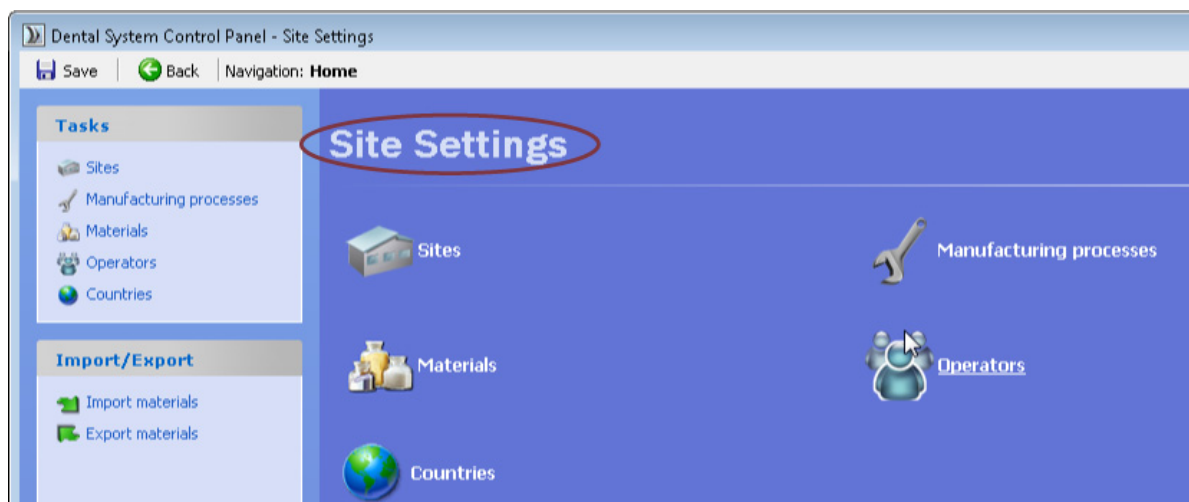
Height to width ratio - defines how high the initial shape of the connector control splines should be according to the width.

6.4 Site Settings



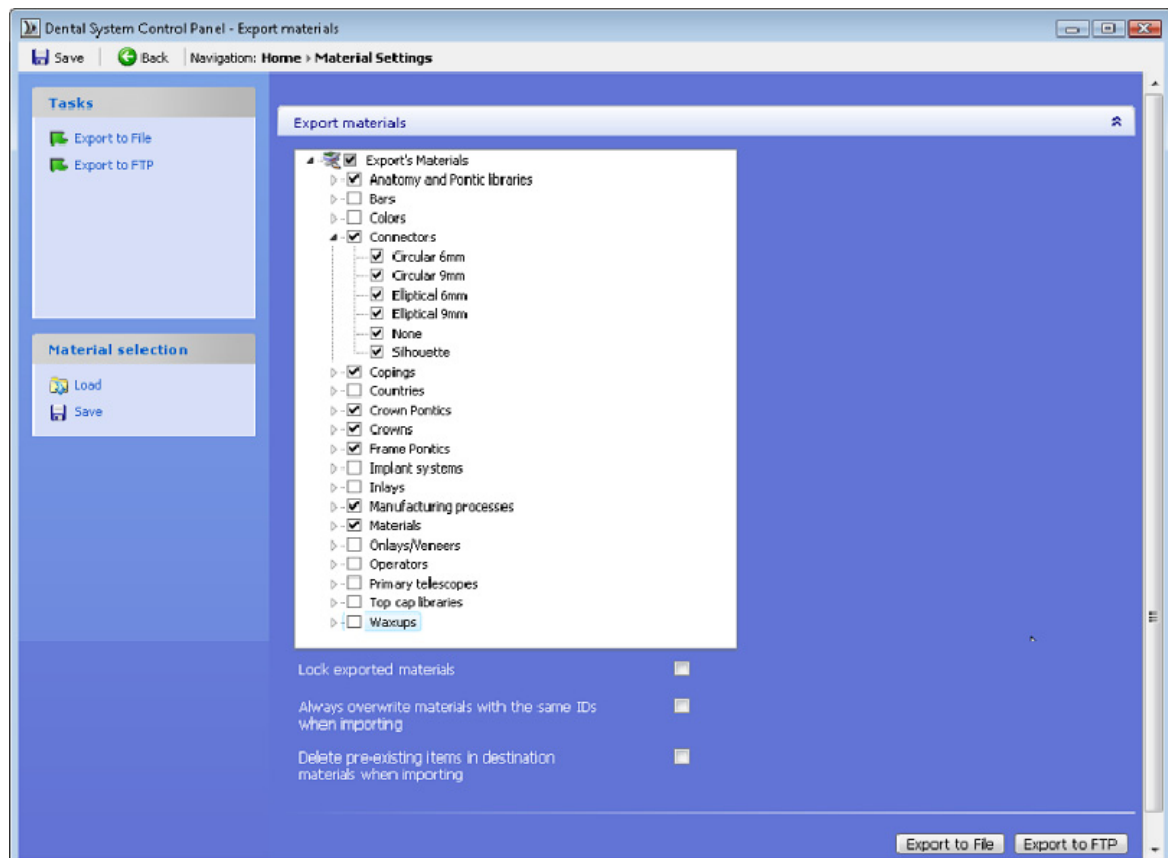
Site Settings category contains the setting for defining **Sites**, **Materials**, **Countries**, **Manufacturing processes** and **Operators**. All these subcategories are described in details in the following sections.

The image below illustrates the main window of the **Site Settings** category. Click on the desired subcategory to get the corresponding settings.



The import and export of the material settings is now possible in Dental System Control Panel. This new functionality provides an easy exchange of materials between the lab and the manufacturer.

You can export materials to the specified file or FTP by selecting the desired materials and clicking the **Export to File** or **Export to FTP** buttons. Select the **Lock exported materials** check-box in case the material settings must not be changed at the receiving end. When you select the **Always overwrite materials with the same IDs** and **Delete pre-existing items in destination materials** check-boxes, the warning dialog windows pop up to make sure that this is what you want to do.



To import the material settings, click on **Import materials** and select the desired folder. You can also download the materials directly from FTP - go to **Site Settings** -> **Sites** and click **Download**. Then select the materials from the list that appeared on a screen and click **Import**.

6.4.1 Sites

The term **Site** is used as a common expression for labs, manufacturers, and clinics. **Site** settings (see the image below) are fundamental for defining relations between the current and other sites and for the work of DentalManager in order to easily transfer orders from the current site to the central manufacturing site (and vice versa).

Edit Site

ID 45126

External ID (for interfacing with third party software)

Name Johnson Milling

Sub-site ID 1

Order number site ID **Copy ID**

Has scanner ☒

Has CAD ☒

Has CAM ☒

Address 1

Address 2

Zip code

City

State

Country Not specified

Phone

Fax

Email

Web address

Contact person

FTP Settings

FTP IP address/URL name 192.168.170.37

FTP port 21

FTP user anonymous

FTP password *****

FTP directory Inbox1

FTP secure socket No TLS Support

Test connection

In the 3Shape Dental System a globally unique **ID** is defined for each site. This means, that each site/lab having one or more licenses for Dental System is defined by an ID which identifies this site on the global level. This has a number of advantages when transferring orders between sites using DentalManager. The **External ID** is used for interfacing with the third party software.

The **Sub-site ID** can be used by sites having multiple stand-alone installations of Dental System. These installations all belong to the same sites, i.e. they have the same globally unique ID, and the Sub-site ID can be used to distinguish the different installations.

The **Order number site ID** is used in the order ID naming template. It is recommended to use the globally unique ID for the site, which can be copied using the **Copy ID** button.

It can be defined for each site whether it **Has scanner** (3Shape 3D Scanner), **Has CAD** (DentalDesigner licenses) and/or **Has CAM** (a manufacturing machine, e.g. milling machine, 3D printer or sintering system).



Note! Only those sites that have **Has CAM** checked can be chosen in the Order Form as manufacturers.

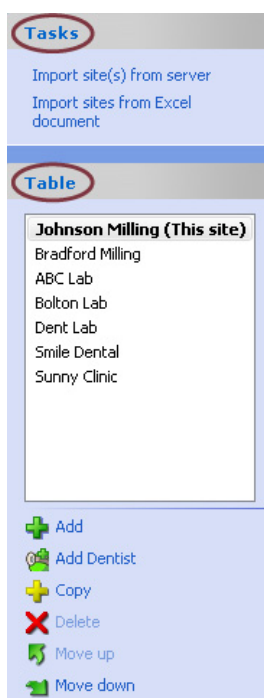
The FTP settings should be specified for the central manufacturing sites and they will allow DentalManager to easily transfer orders from the current site to the central manufacturing site.



Note! If the current site also acts as a central manufacturing site receiving orders from other sites through DentalManager, then the **Manufacturing Inbox Module** must be available and the FTP settings for the current site must be specified in the **Inbox** settings.

The FTP must be provided by the central manufacturing site and verified with the **Test connection** button. If the connection succeeds, a green check-mark appears next to the button.

The contact information of the site can be typed in the provided fields (see the image above).



An important functionality called **Import site(s) from server** is available under **Tasks** in the upper left part of the *Site Settings* window. Pressing this link will automatically import a number of sites including IDs and FTP settings, thus facilitating the setup for order transferring through DentalManager.



Note! Importing sites will only work if your Software Provider of the Dental System has already supplied these settings to you.

The discussion and figures in this section assumes that the 3Shape Dental System is a standard (non-encrypted) system. For encrypted systems several of the settings cannot be edited by the users, as they are already provided by the Software Provider of your system and should not be changed.

The users can also import sites from the Excel document (see the image to the left), which makes the workflow easier and faster. The format of the Excel file needs to be as follows:

Name:	<i>John Silver</i>	ZIP Code:	<i>12000</i>
External ID:	<i>010001</i>	Country:	<i>AU</i>
Invoice Name:	<i>John Silver</i>	Phone:	<i>800-502-0958</i>
Address 1:	<i>12 Ocean Road</i>	Fax:	<i>800-502-0959</i>
Address 2:	<i>14 Maple Street</i>	E-mail:	<i>jsilver@exmpl.au</i>
City:	<i>Sydney</i>	WWW:	<i>www.jsilver.com</i>
State:	<i>NSW</i>	Contact person:	<i>John Silver</i>

In the *Table* window (see the image to the left) you can edit your site list at any time (add, copy, delete etc.). Click on the desired site and its settings will appear in the right part of the window.

6.4.2 Materials

These settings (see the image below) identify materials to be used for the construction elements.

Please see *Basic Elements* chapter (**Materials** subcategory) for the detailed description of these settings.

Edit Material

ID: Configuration_11_Material1 Change ID

External ID (for interfacing with third party software):

Name: Zirkon

Shader material: Zirconium

Default scan module: Use 3Shape Default

Default design module: Use 3Shape Default

Use colors: ☒

Minimum manufacturing values (validation)

Write protect validation settings: ☐

Validation enforcement policy: User can choose to ignore violations

☒ Minimum wall thickness: Distance from margin line

☒ Minimum connector area: 7.00 mm²

☐ Minimum connector strength: 0.00 mm

6.4.3 Countries

Countries settings identify the country to be used in the site data (see the image below). Use the list to the left to choose the country you need. When you click on a country, the **ID** and **Name** in the left part of the window automatically change. You can add/delete countries at any time.

Country

- Denmark
- Australia
- Austria
- Belgium
- Canada
- Switzerland
- China
- Cyprus
- Czech Republic
- Germany
- Egypt
- Spain

Edit Country

ID: DNK Change ID

Name: Denmark

6.4.4 Manufacturing Processes

The **Manufacturing processes** category (see the image below) specifies how the construction elements are produced. The users of the Dental System applications have one or more manufacturing processes available, e.g. milling machines, 3D printers or sintering systems (please contact your distributor to learn more of the available processes). For each Manufacturing process it is possible to define manufacturing specific settings (e.g. drill radius of a milling machine).

Table

Milling R0.4mm
Milling R0.5mm

+ Add
+ Copy
X Delete
Move up
Move down

Recycle bin

No items
Restore all items
Empty the Recycle Bin

Details

Total: 2 items

Edit Manufacturing process

ID: Configuration_11_ManufProcess30 [Change ID](#)

Name: Milling R0.4mm

Manufacturing process method: CADOutputRawSTL.dll [Select](#)

Milling: ☒

Additional milling information:

Drill tool shape: Sphere

Drill compensation: ☒

Drill compensation offset: 0.660 mm

Drill radius: 0.650 mm

Materials

- ☒ Zirkon
- ☒ Titan
- ☒ Wax

Manufacturers

- ☒ Johnson Milling
- ☒ Bradford Milling



Caution! Changing the provided settings can have a significant effect on the quality of the manufactured construction elements. Please contact your distributor prior to making any changes.

The **Manufacturing process** combines manufacturing with the available manufacturers (as specified in *Sites* section) and materials (as specified in *Materials* section). As seen from the image, you can specify a manufacturer for a particular manufacturing process and the materials for this process. These settings are then reflected in the order form.

6.4.5 Operators

Operators settings identify the users of the 3Shape Dental System applications. These operators can be chosen in the Order Form and, optionally, the names of the operators can be part of the order ID. You can modify the Operator list (add/delete etc.) at any time.

Operator

Tech 01

Edit Operator

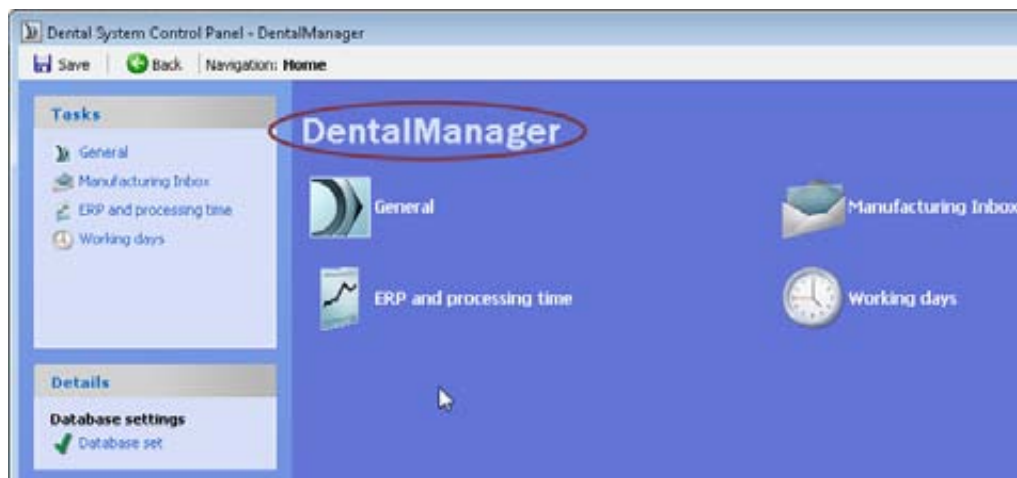
ID: Configuration_11_IDOperator01 [Change ID](#)

Name: Tech 01

6.5 DentalManager

DentalManager category contains settings for customizing 3Shape DentalManager.

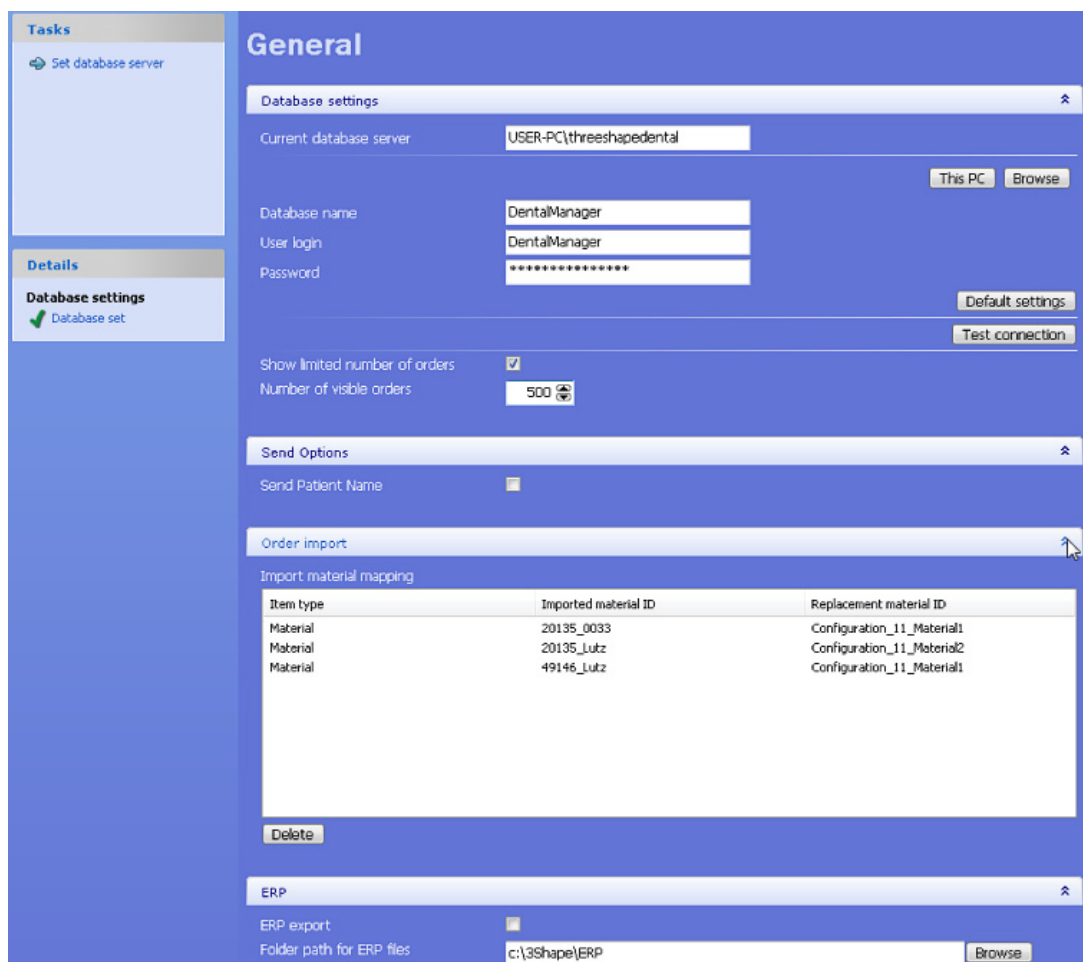
When entering the **DentalManager** category, a screen similar to the image below appears. Depending on the dongle configuration **Manufacturing Inbox** (an Add-on to DentalManager) can be available or unavailable. The image below illustrates this category with **Manufacturing Inbox** present:



The four subcategories - **General**, **ERP and processing time**, **Manufacturing Inbox** and **Working Days** are described in details further.

6.5.1 General

General subcategory contains settings related to the database:



Tasks

- Set database server

Details

Database settings

Current database server: USER-PC\threeshapedental [This PC] [Browse]

Database name: DentalManager

User login: DentalManager

Password: [masked]

[Default settings] [Test connection]

Show limited number of orders: ☒

Number of visible orders: 500 [up/down arrows]

Send Options

Send Patient Name: ☐

Order Import

Import material mapping

Item type	Imported material ID	Replacement material ID
Material	20135_0033	Configuration_11_Material1
Material	20135_Lutz	Configuration_11_Material2
Material	49146_Lutz	Configuration_11_Material1

[Delete]

ERP

ERP export: ☐

Folder path for ERP files: c:\3Shape\ERP [Browse]

Database settings

The database server can be set manually, with the help of the **Browse** button or clicking the **Set database server** in the upper left corner of a window. Click **This PC** button if the database is installed on the local computer.

Click **Default settings** button to add the default instance name (*threeshapedental*), as well as **Database name**, **User login** and **Password**.

The database connection can be verified by clicking the **Test connection** button. A green check-mark appears next to the button in case of a successful connection.

Selecting the **Show limited number of orders** check-box allows to define the default number of visible orders. A smaller amount of the displayed orders improves the overall performance of the application. Specify the **Number of visible orders** in the provided field.

Send options

If **Send Patient Name** check-box is selected, the name of a patient is sent to the manufacturer together with an order. If not then the patient name is removed from the sent order file.

Order import

When a dental lab sends an order to the central manufacturing center, the manufacturing center has ideally already exported its material settings to the lab (please see *Sites* chapter for more information). In this case the lab can create an order which matches the manufacturer center settings (e.g. with regards to materials, manufacturing processes, coping thickness, etc.).

However, if the order sent from the lab is not based on the materials imported from the manufacturer center, then the manufacturer needs to perform **Import material mapping** when the order arrives at the 3Shape DentalManager Inbox. This means the manufacturer needs to define, for instance, which of his own materials corresponds to the material defined at the lab. This mapping is stored, so the manufacturer does not need to do the same mapping the next time the lab sends a similar order, and this part of Dental System Control Panel lists these previously stored mappings (showing **Imported material ID** and **Replaced material ID**). The manufacturer can delete selected mappings by pressing **Delete** if necessary.

ERP

When **ERP export** check-box is marked, it allows to export ERP files to a specified folder. You can change the **Folder path to ERP files** either manually or by using the **Browse** button.


A powerful extension to the 3Shape Dental System is the ability to share one common database among several computers which improves capacity and efficiency. A typical example is when one scanning PC and one design PC are working simultaneously. To setup a common database, both computers need to be configured to point to the same database setup.




Note! A shared database normally requires a common 3Shape Dongle Service and a shared (Server) installation.

6.5.2 ERP and Processing Time

The aim of the ERP export from DentalManager interface is to automatically enable the order information exchange between DentalManager and the manufacturer ERP system such as Microsoft business solution, SAP, Oracle or JENMAR. The exported information can be used for accounting, shipping etc. The actual configuration is made in Dental System Control Panel: go to

ERP and processing time, click **Add**  and select ID for your new entry, fill in the fields with the necessary settings:

6.5.3 Working Days



For your convenience the configuration of the processing times and delivery dates is possible.

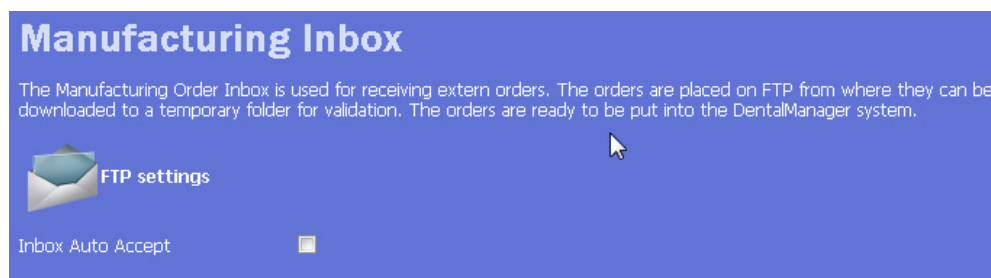
Specify the number of days for **Default shipping time** and **Manufacturing Processing and Shipping time**.

Click on dates in the calendar to mark them as working days, weekends or annual holidays.

6.5.4 Manufacturing Inbox

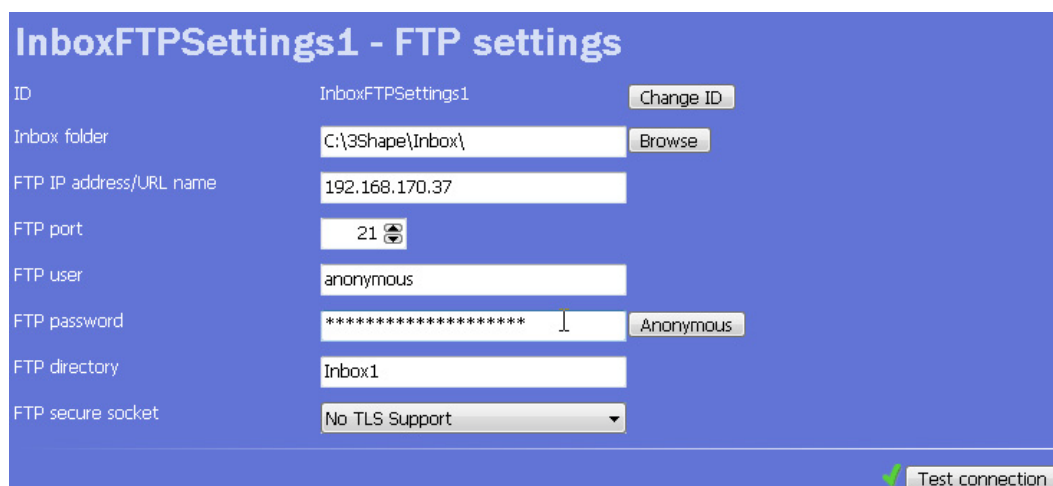
The DentalManager Inbox Module supports multiple FTP servers for high-load central production. The module allows handling orders created and sent from customers. In order for the Inbox to function, an operational FTP server must be available.

When you go to Manufacturing Inbox, the window as shown in Figure below is displayed:



The **Inbox Auto Accept** check-box defines whether to accept files to Inbox automatically or not.

Click on **FTP settings** to access the *Inbox-FTP settings* window:




The **Inbox folder** path defines where the orders downloaded from FTP are stored before they are inserted into the DentalManager system. This folder is common for all FTP servers. Note that you must have read and write access to the Inbox folder.

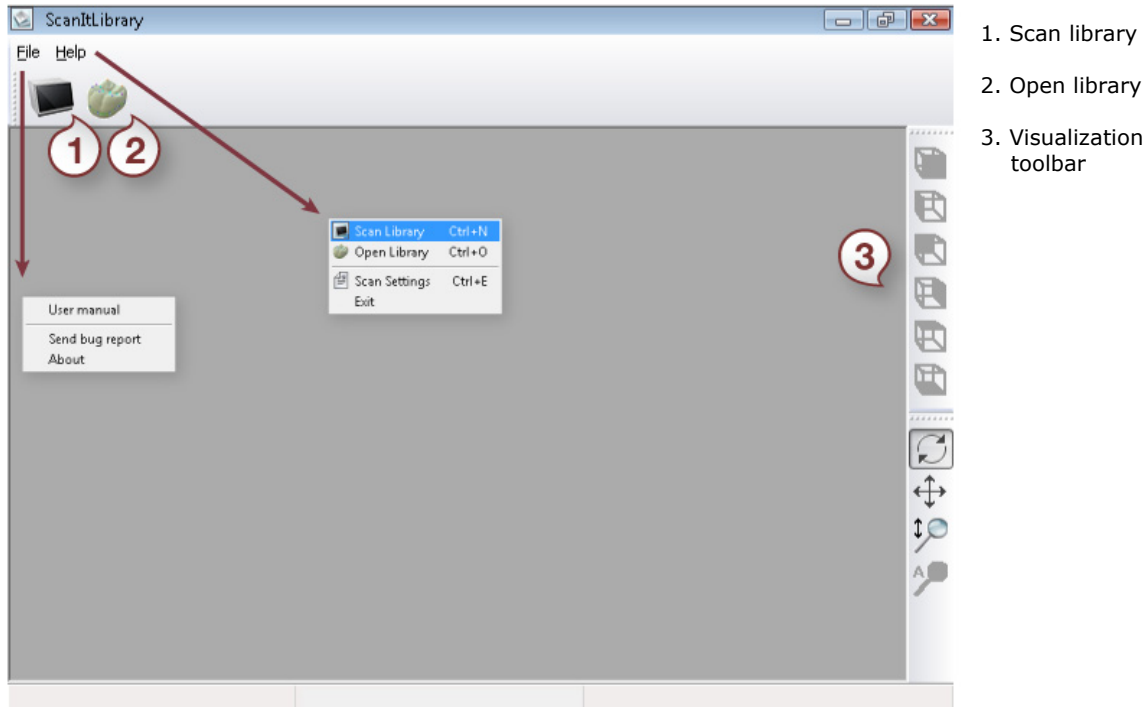
Set the FTP settings according to the actual FTP server (the URL can be specified either as shown in the image above or by using the IP address). When this is done, the connection may be verified by clicking **Test connection** button.

7 Custom Libraries - ScanItLibrary

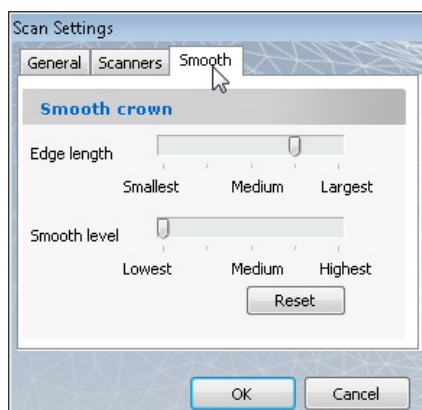
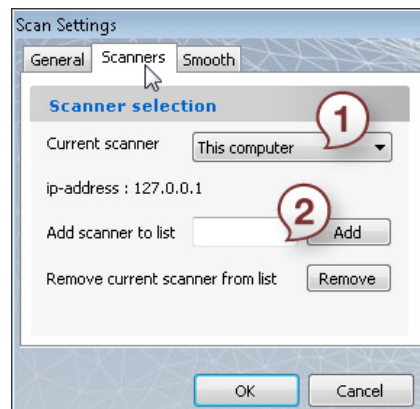
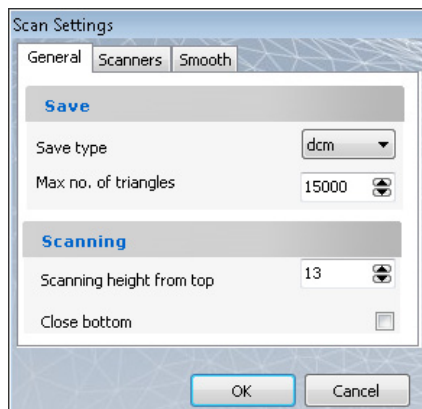
ScanItLibrary module allows adding custom libraries to the available standard ones.

In this chapter you will learn how to define, scan and save your own dental models e.g., crowns, pontics, etc.

The ScanItLibrary module is started from the icon in DentalManager  or via the program menu. The image below shows the **ScanItLibrary** interface layout and the view of the expanded **File** and **Help** menus.



7.1 ScanItLibrary Settings

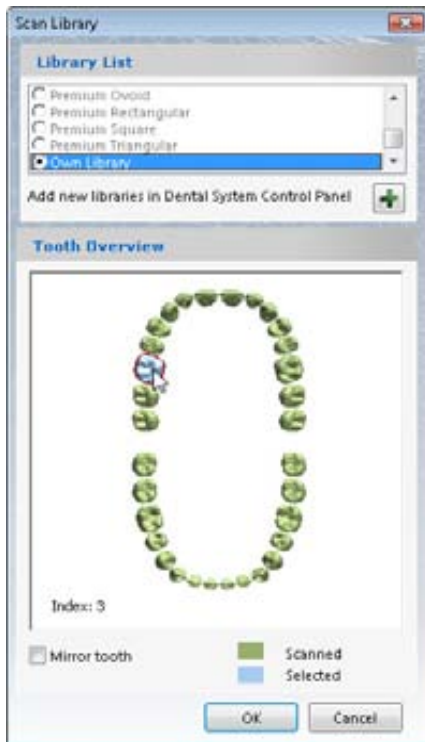


1. Select your scanner
2. Fill in your scanner's name/location, click **Add** to save



Before performing a scan, make the necessary adjustments to the Scan Settings opened via **File->Scan Settings** of the ScanItLibrary menu.

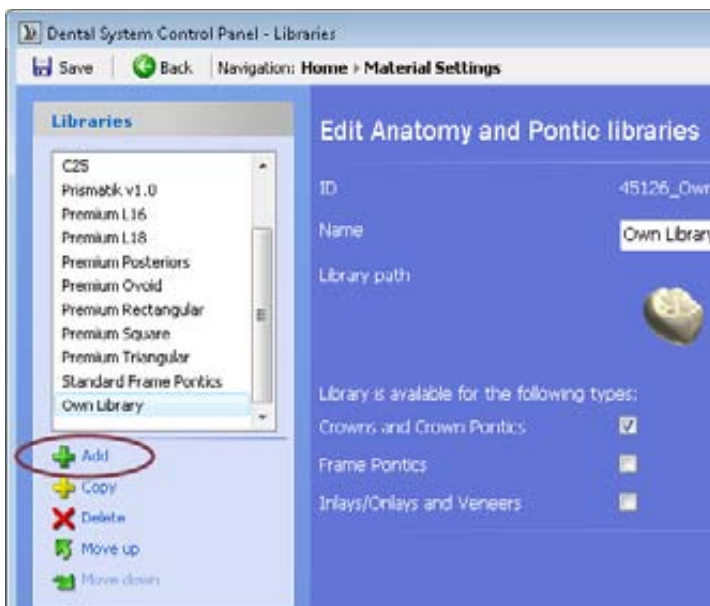
The three tabs allow you to define General, Scanner and Smooth settings.

7.2 Adding Model to Library



Once the settings described in the previous chapter have been made, you can add a new custom dental model to the library via the Dental System Control Panel as you need to define your new library before performing a scan.

1. Select *Scan Library* from the *File* menu or click the corresponding  icon to open *Scan Library* window.
2. Click the **Add**  button to open Dental System Control Panel at the *Libraries* page.



Click **Add** button, confirm the library Base Path, name your model and click **OK** to save.

The created model listing should now appear in the *Libraries* list.


Select created model from list and specify the required model types in the **Edit Anatomy and Pontic Libraries** frame.

Edit Anatomy and Pontic Libraries

ID 45126_Own Library46 [Change ID](#)

Name Own Library

Library path

 **Library path**
C:\Program Files\3Shape\Dental System Control Panel\Library\3ShapeCustom\Crowns\OwnLib\

Library is available for the following types:

- ☒ Crowns and Crown Pontics
- ☐ Frame Pontics
- ☐ Inlays/Onlays and Veneers

Click the **Save** button to store your model changes in the library.



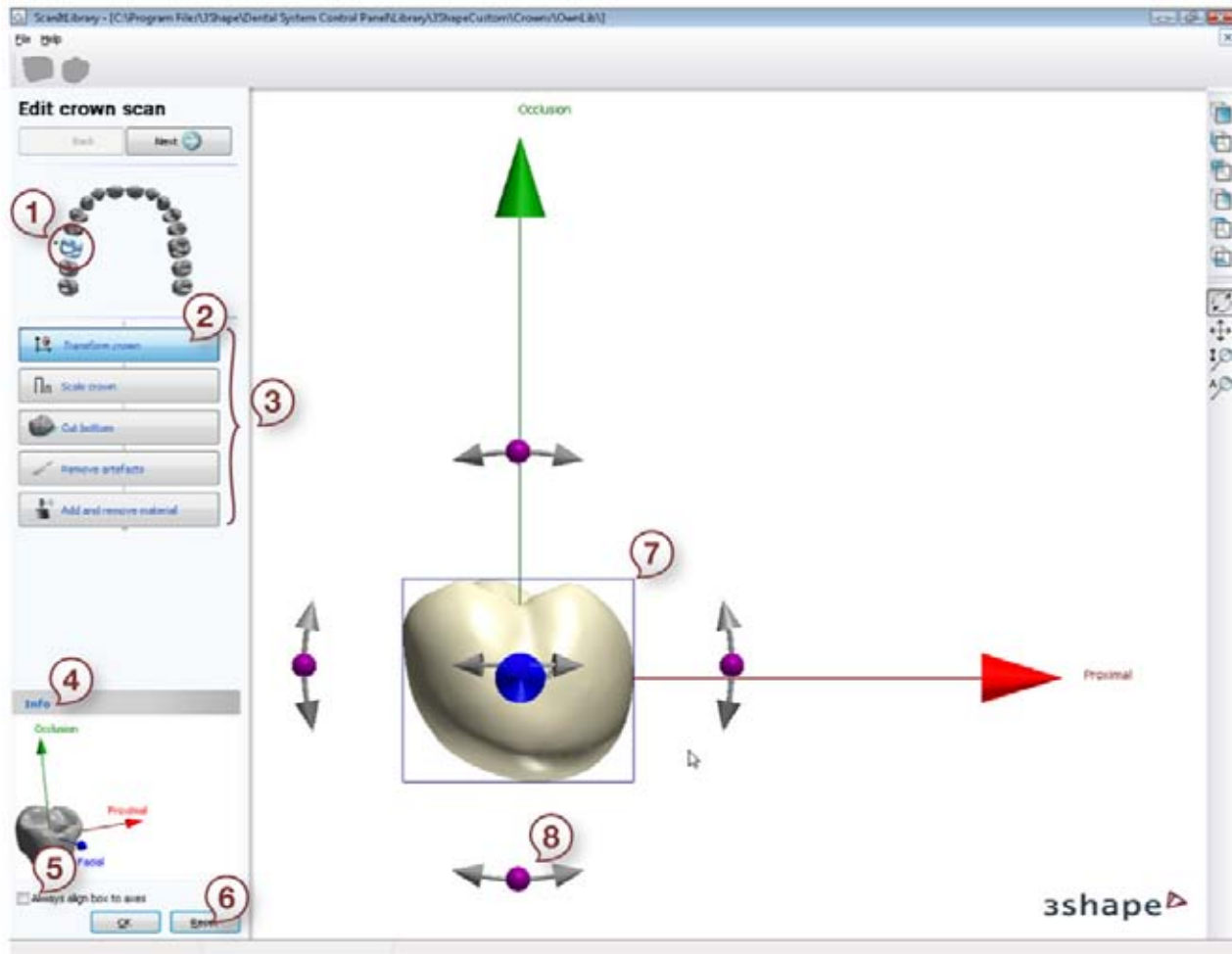
Switch back to the *Scan Library* window, select the created Library from the list and click the tooth to scan. The selected tooth becomes colored in blue. If the *Mirror Tooth* checkbox is marked, the mirrored tooth will be saved as well. The already scanned teeth appear colored green.

Insert your model into scanner and start scanning by clicking the **Next** button.

On completion of the scanning process, you should edit your scan.

* Scanned tooth

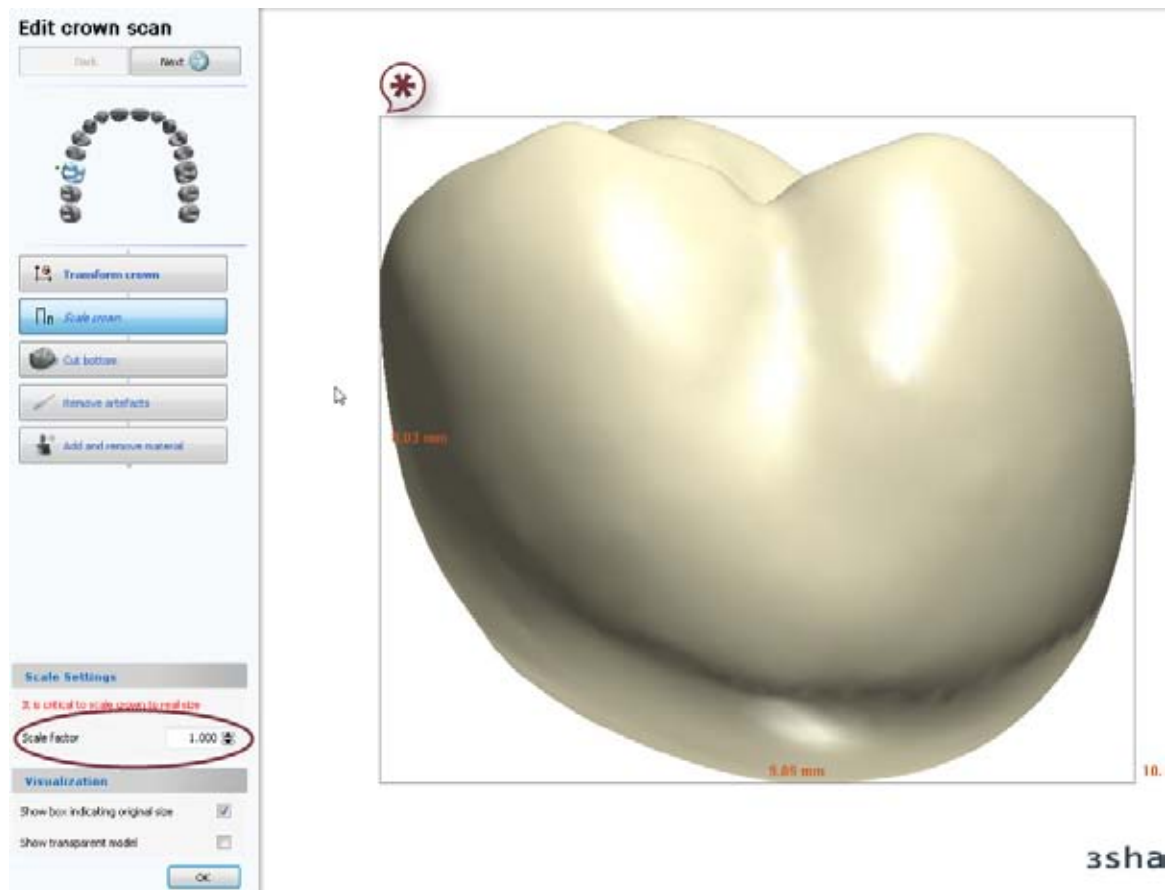
Perform transformation of the scan by dragging the orientation points with the cursor to the desired position.



1. Scanned tooth
2. Currently selected stage
3. Editing stages
4. Information window

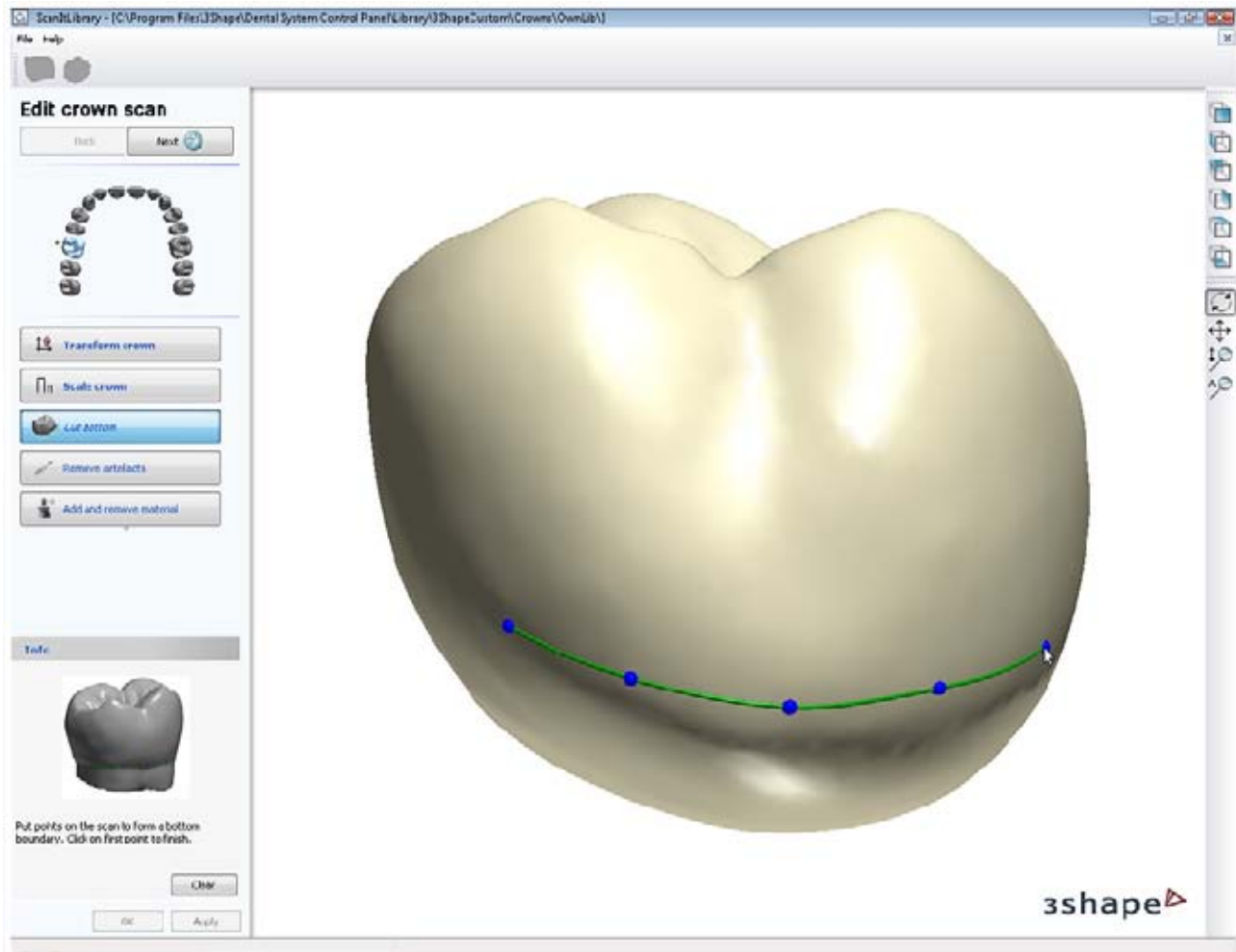
5. Aligns the orientation box to axes when marked
6. Returns model to original position
7. Orientation box
8. Drag points with cursor for desired orientation

Scale your scan by selecting the Scale Factor as shown on the image below. It is vital to scale the model to its real size.

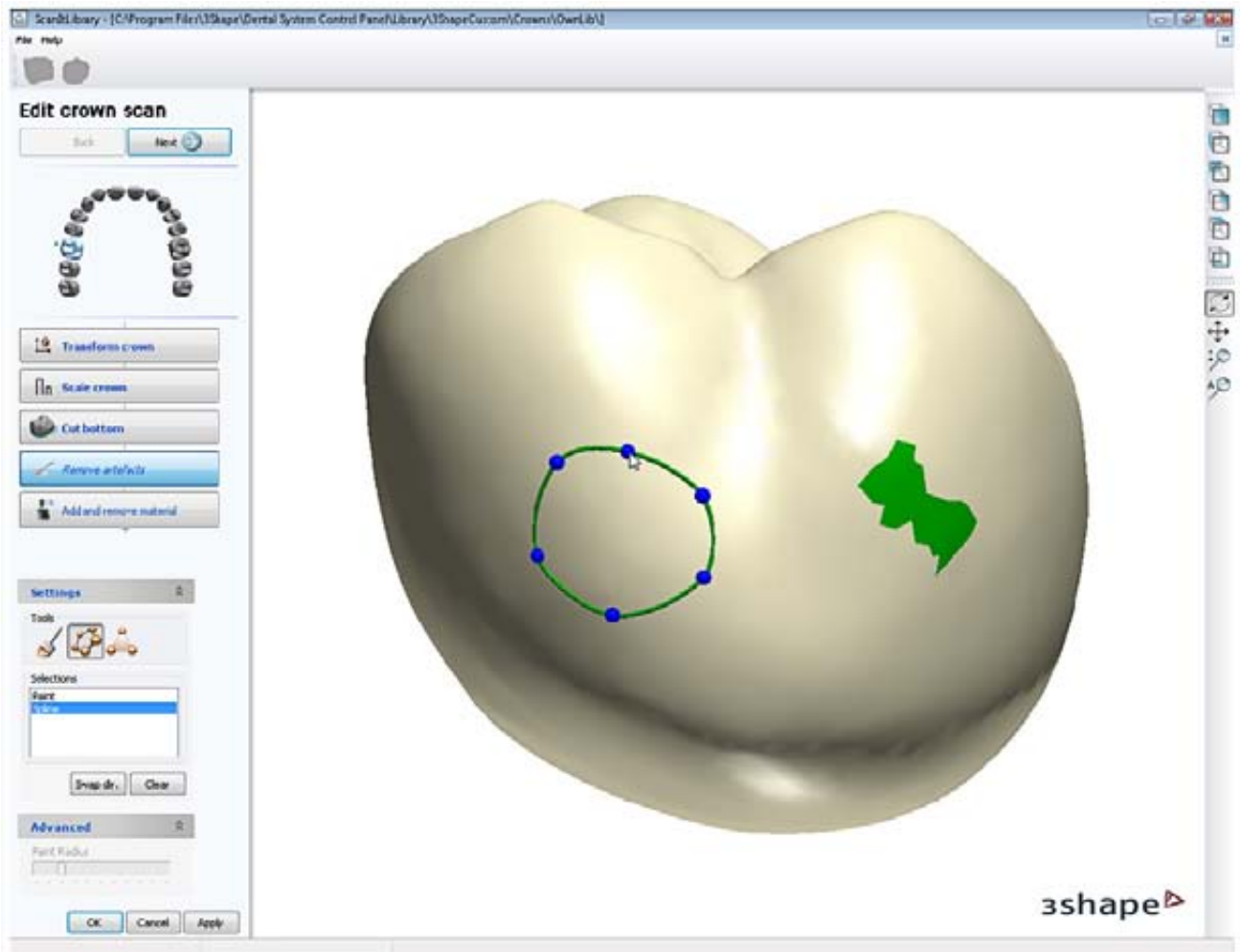


* Box indicating the original size

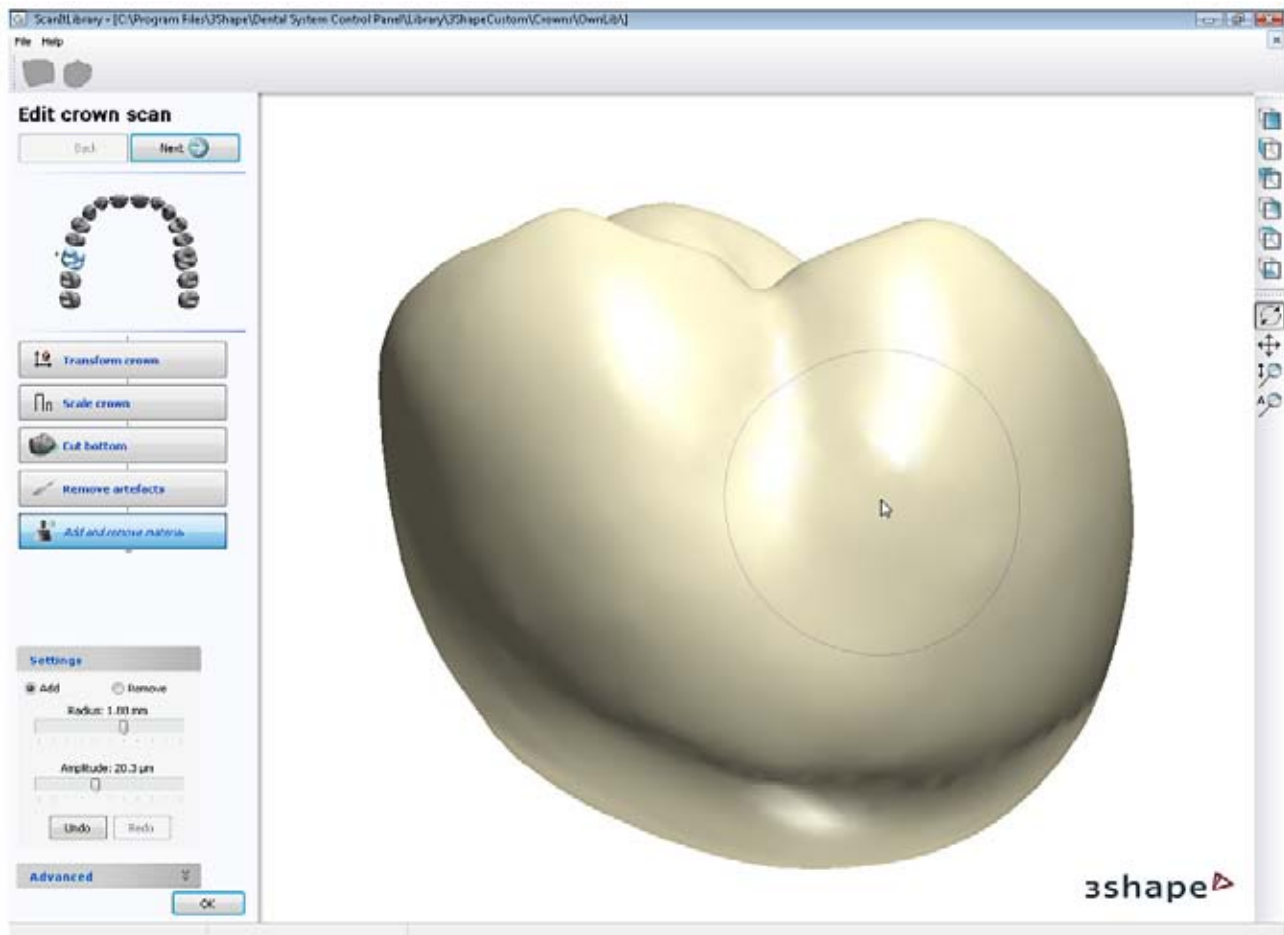
Cut bottom of the model to form a boundary by placing point for the bottom boundary with the cursor and click the **Apply** button.



Remove artifacts if needed using Paint, Spline selection or Plane Cut tools.

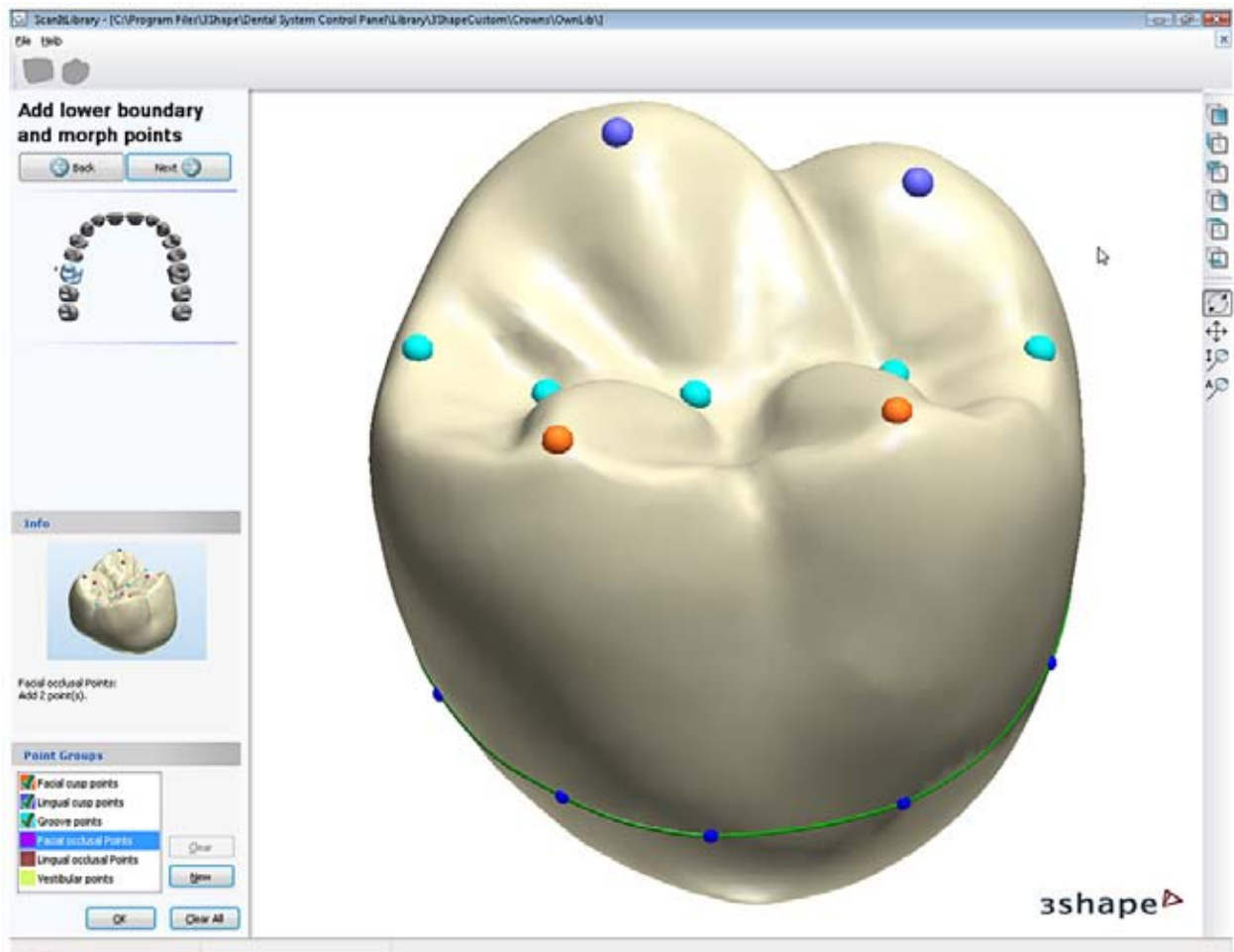


Add or Remove material if required at the last editing stage.

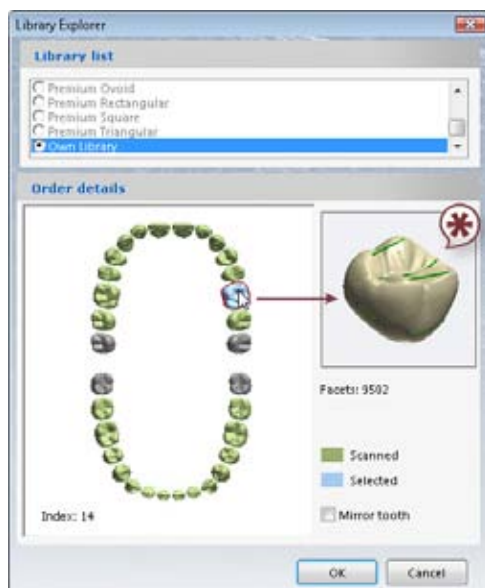


Add lower boundary morph points.

In order to use the automatic initializing of the crown design, it is necessary to add a lower boundary to the scan and a number of morph points. The method for adding the lower boundary is similar to the bottom boundary described above. When the boundary has been added, you are guided to add three types of morph points. When the required points have been added they are marked with ticks as shown on the image below. Optionally, you can also create custom Point Groups by clicking **New**. Having finished with the morphing points, click **Next** to complete scanning and saving operations.



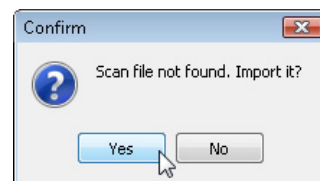
7.3 Library Explorer



You can explore the library by selecting *File->Open Library* in the ScanItLibrary application to open the *Library Explorer* window as shown on the image to the left.

You can select library items in the listing and preview scanned models.

When you select the tooth that has not been scanned and its scan is not found, the *Import Scan* alert appears:



* Selected library item preview



Note! You receive a warning message that the library cannot be changed when selecting the standard library items.

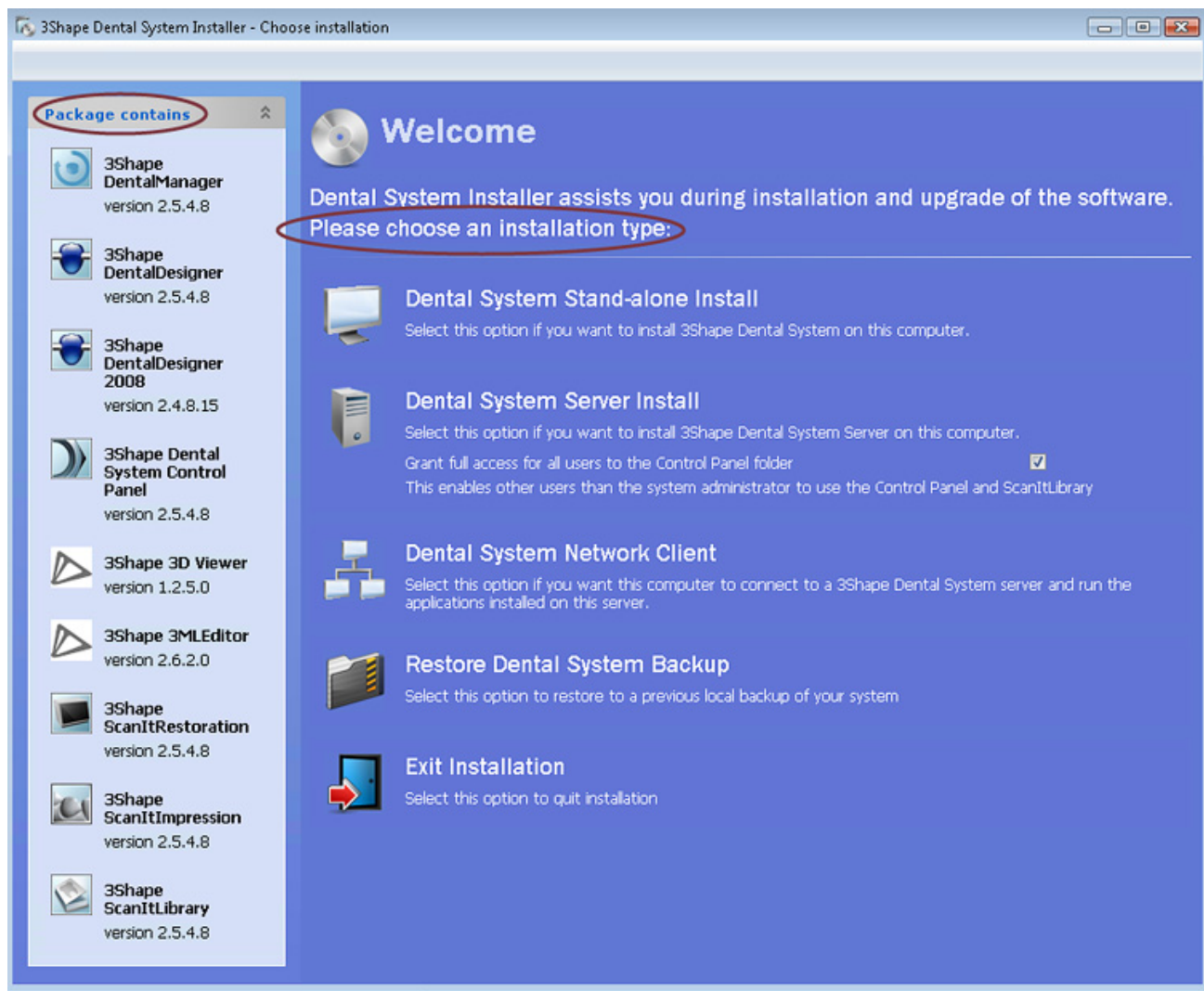
8 Dental System Installer

Installation and upgrade of 3Shape Dental System is done using the Dental System Installer application. During the upgrade you will be asked to make a choice regarding the type of installation and whether or not to create a backup, etc.








Note! it is strongly recommended to have your system connected to the internet during installation. If you cannot be online, you are still able to complete the installation but it may be with limited materials settings etc. However, the settings can be updated later via the Dental System Control Panel.

When you start the installation process and launch the 3Shape Dental System Installer, the **first step** that you are brought to is to **Choose Installation**:



The column to the left displays the applications that this package contains. In the right part of the window you are given the list of installations and options from which you have to choose one.

	Stand-alone installation is ideal if you want to run all 3Shape Dental System applications from this computer (i.e. the scanner-PC). The software and order data are stored locally on this computer.
	Server installation is ideal if you want to run the 3Shape Dental System applications from different computers within the site. The software and order data are stored locally on your Server computer, but the drives are mapped as network drives so they can be seen by the network client installations.
	Network Client is ideal if you have already have a Server installation on a computer within the site. It will simply makes desktop links to the software on the Server computer. The software and order data are stored on the shared network drives of Server computer that can be seen by the network client installations.
	Restore Backup - select this option to go to your previous local backup of the system.
	Exit installation - select this option to quit the installation.



Note! The backup can be retrieved automatically from a previous 2009-1 installation whereas a backup of a previous 2008-1 Dental System installation must be restored manually.

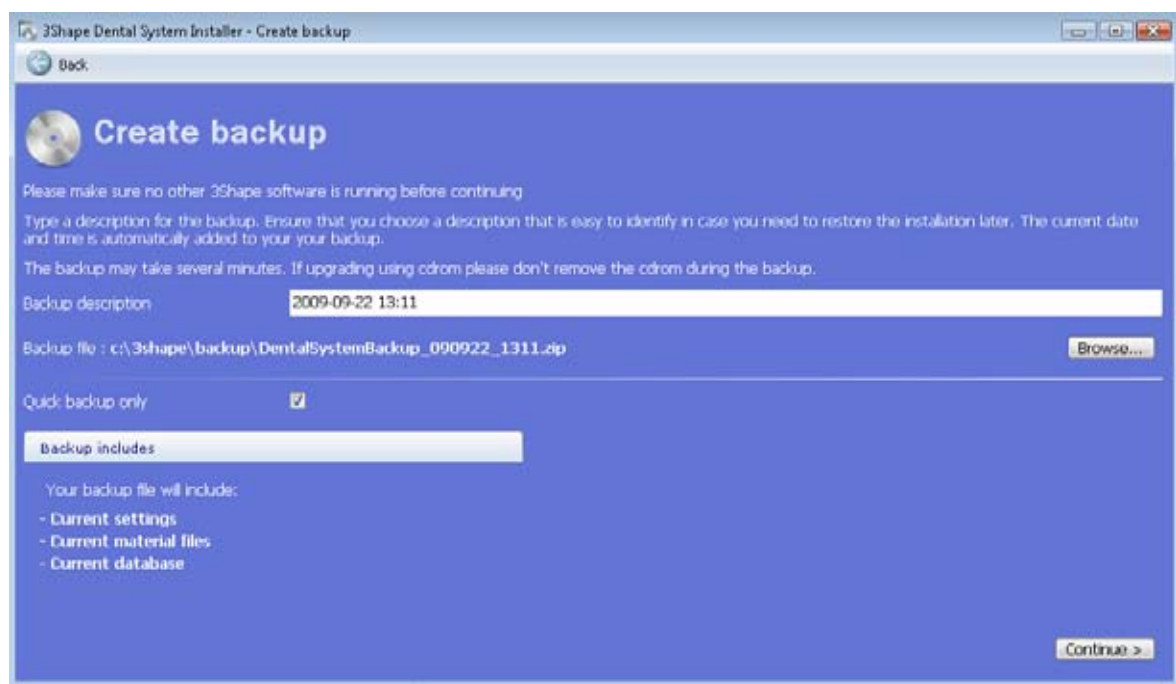
The **Stand-alone** installation is recommended if the software is only going to be used from a single computer within the site.

The **Server/Client** installation is recommended if the software is going to be used from more computers within the site. Naturally this installation requires that the internal network within the site is configured in such a way so that the different client computers can all access the Server PC.

The advantages of the **Server/Client** installation in this case are:

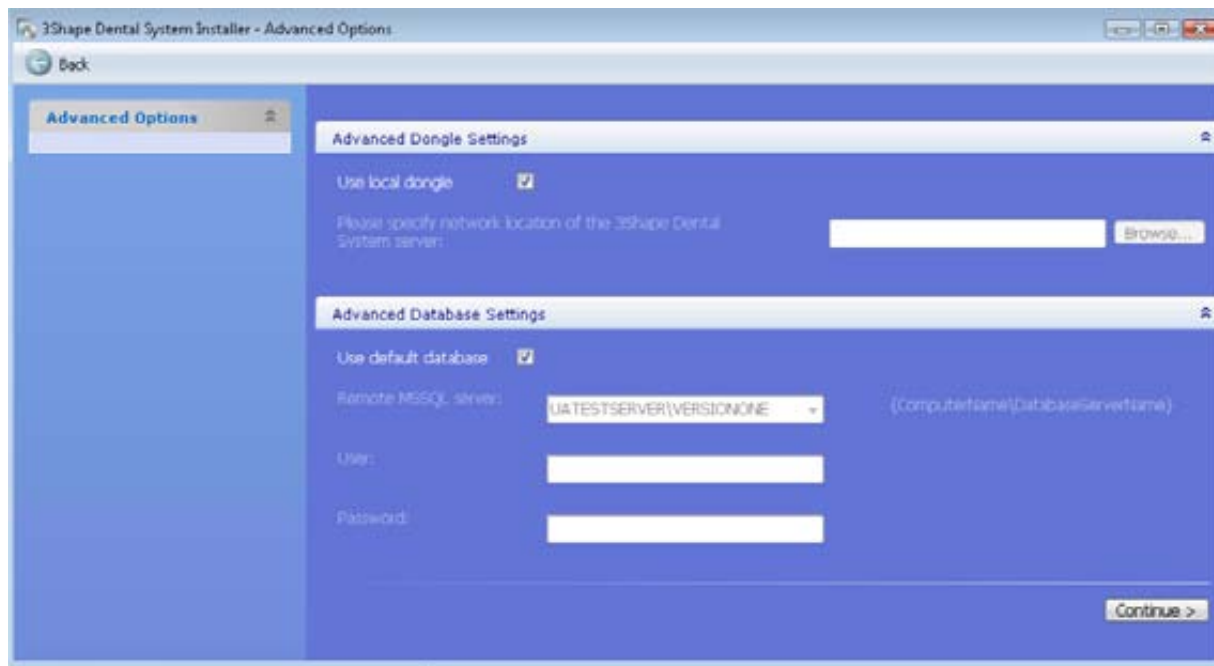
- The software is only installed on a single computer, making this and future upgrades and maintenance simple.
- All the orders within the site are stored in the same shared folder and in the same database.
- The client installations can be made on and operated from all computers within the network of the site, so you are not limited to work on a specific computer (3Shape Dongle Server handles the available licenses).

Click one of the icons to choose the installation (it will become highlighted as shown on the image above). The program brings you to the **second step - Create backup**:



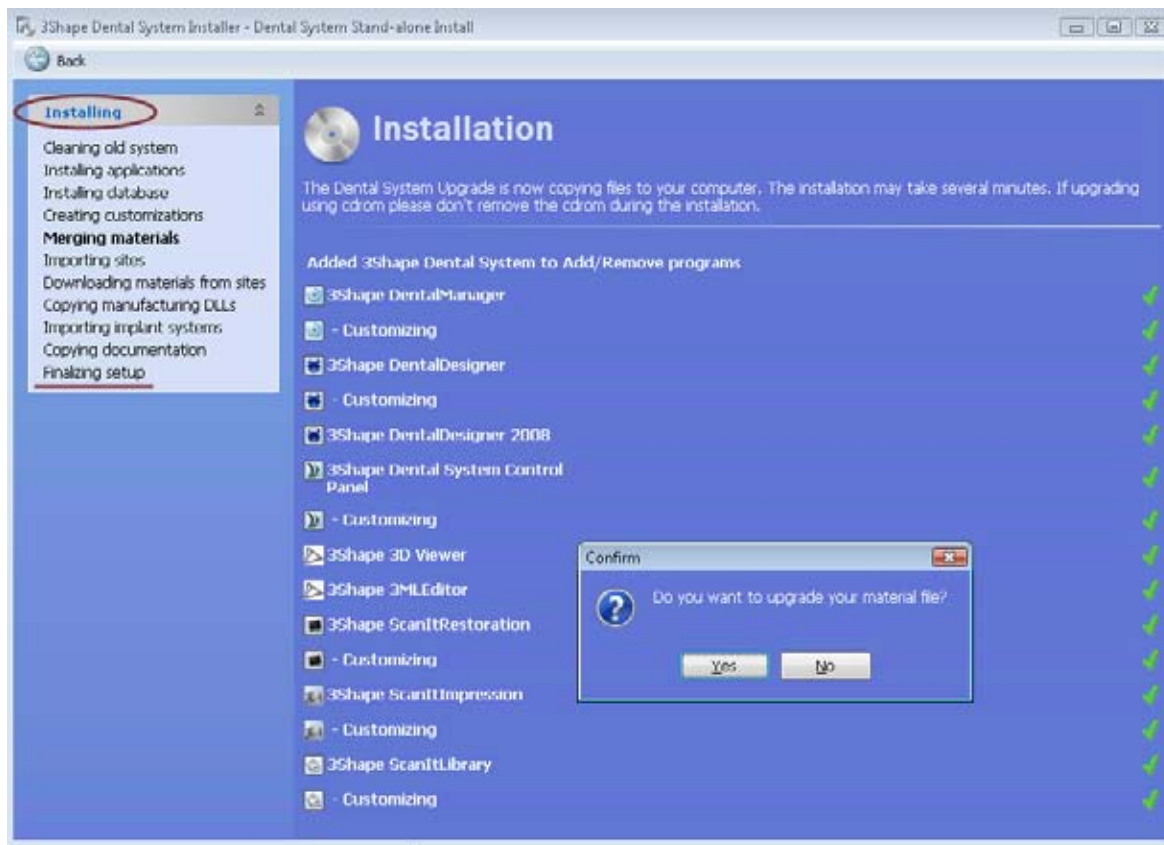
Please read the instructions in the window to create your backup successfully. You can view the content of your backup under the **Backup includes** tab. If you select the **Quick backup only** check-box, your backup will include only the current settings, material files and the database.

After you click **Continue**, the Save as window appears so you can save your backup in a folder. When this process is completed the program automatically brings you to the **third step - Advanced Options** (see next page):



You have to specify the dongle and database settings for your upgrade. You can choose to use either the local dongle or a PC on the network where the 3Shape Dongle Service is running. Likewise you can choose either the default database on the local PC or a remote MSSQL server. For the remote MSSQL server you must specify the location of the server and enter the user name and password.

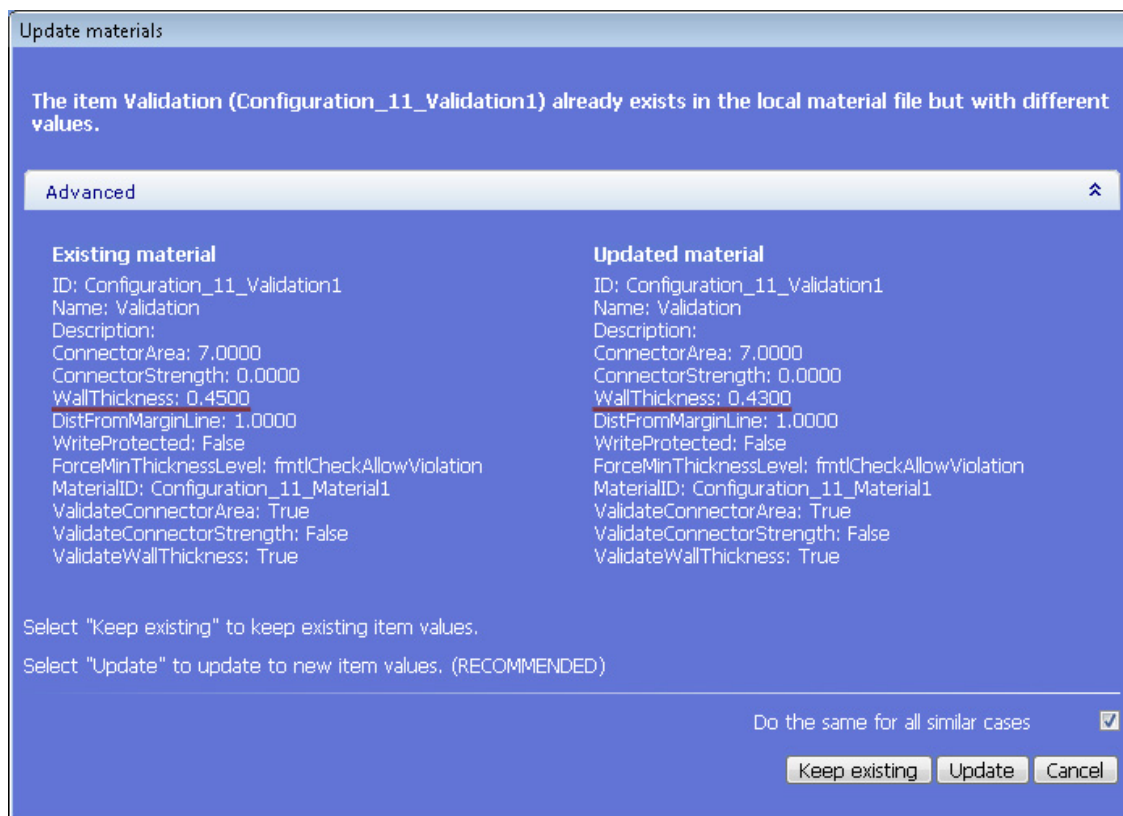
Click **Continue** to go to the **forth step - Installation:**



The process may take several minutes. In the upper left corner of the window you can see the installation procedure step-by-step, with the current step being highlighted in bold (see the image above). In the right part of the window the installed

applications are displayed. Select the **Open "What's New" PDF?** check-box to view the document with the new features in 3Shape Dental System 2009.

If the material item that exists in the local material file is different from what is provided in the Installer, the *Update materials* window (see below) pops up offering you to update (recommended) or keep the existing item values.



At this step it is also possible to download the material settings from Manufactures. The *Download materials* window will pop up offering you to select the sites you want to download materials from. Select the desired check-box and click **OK**.

Click **Finish** to complete Dental System Upgrade.

Appendix A - System Requirements

CPU:	Intel Core 2 Duo 2.0GHz or better
HDD:	80GB or more
RAM:	2GB or more
Graphics:	OpenGL 2.0 support and at least 512 MB of memory
OS:	Windows XP SP2, SP3 or Windows Vista SP1
Network:	Network Internet connection
Mouse:	Wheel button support

Appendix B - Using Mouse and Keyboard

The use of a mouse and keyboard for common functions in 3Shape Dental System is identical to the standard windows applications.

Most of the steps in the modelling process involve operations with the mouse. The main function of the right mouse button is related to visualization. E.g., with default setting in DentalDesigner, you can use the right mouse button to pan the model and rotate it in the 3D view.

The mouse wheel is used to zoom and change pan of the view, as described in the table below:

Mouse wheel	Action
Wheel down	Pan view - When pressed, move the mouse in the 3D view to pan.
Wheel scrolled	Zoom view – Scroll mouse wheel in the 3D view to zoom in and out.

It is possible to change the 3D view using keyboard shortcuts. While holding down one of the keyboard keys and the right mouse button pressed, use the cursor to perform the described operations:

Key	Action
Alt	Pan view - When pressed, use the right mouse button to pan the view.
Ctrl	Rotate view - When pressed, use the right mouse button to rotate the view.
Shift	Zoom view - When pressed, use the right mouse button to zoom in and out.

Appendix C - Motion Controllers Support

Dental System products support SpaceBall motion controllers, Wacom Graphire and Bamboo graphics tablets or other tablets complying with the WinTab standard.

The indicated controllers use USB interface to connect to a computer and must have appropriate drivers installed to function correctly. Please refer to the manufacturer web site for support on the latest drivers available for your controller.

Graphics Tablet Support



A graphics tablet is an electronic device that allows to hand-draw images the usual way, with the images appearing on a computer screen.

Some tablets can also be used for primary pointing and navigation instead of the mouse.

The Dental System supports graphics tablets complying with the WinTab standard.

While in DentalDesigner mode, the graphics tablet stylus supports the following functions:

Second Stylus Tip Support

When working with the **Sculpt** toolkit, you can add material to your model with the main end of the stylus, while the excessive material can be removed with the opposite end of the stylus.

Pressure Sensitivity Support

When working with the **Sculpt** toolkit, you can increase/decrease the amount of added, removed or smoothed material by applying more or less pressure on the stylus.

SpaceBall Support



Spaceball is a motion controller that works in conjunction with the mouse and enables you to navigate through 3D images quickly. The device contains the navigation ball and programmable buttons.

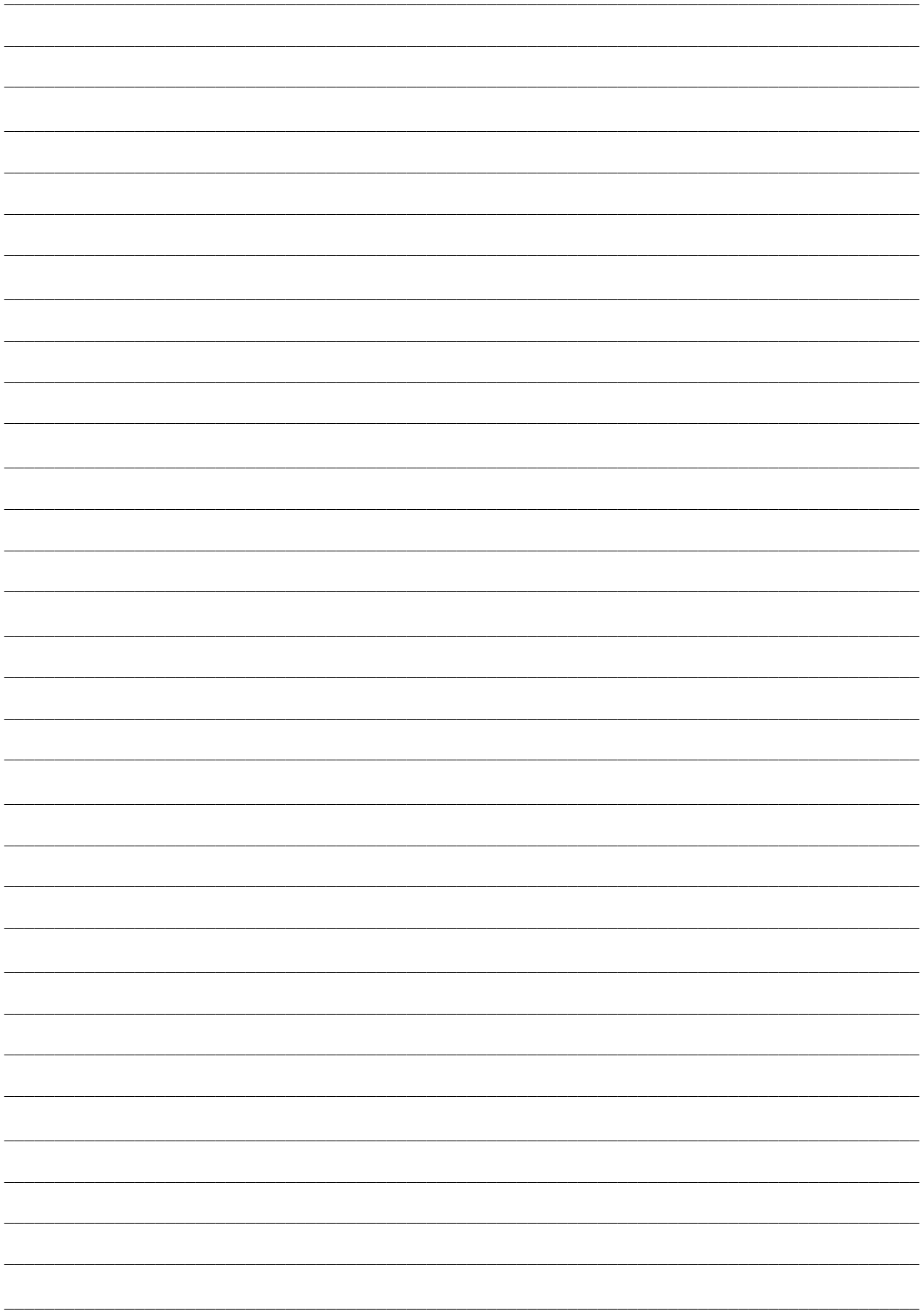
Utilization of 3D software implies to the use of different keyboards keys, interface buttons and mouse buttons to switch between panning, rotating and view zooming. This awkward way of working is eliminated by employing the Spaceball as the single controller that can be now used to complete many functions without having to toggle between different navigation modes.

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